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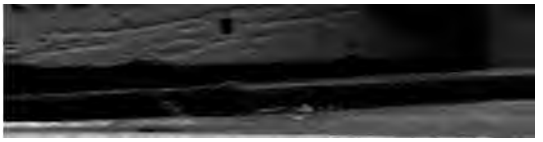

STATE BOARD
EXAMINATION
QUESTIONS & ANSWERS

OF THE

United States and Canada

A PRACTICAL WORK GIVING AUTHENTIC QUESTIONS AND AUTHORITATIVE ANSWERS IN FULL THAT WILL PROVE HELPFUL IN PASSING STATE BOARD EXAMINATIONS. REPRINTED FROM THE MEDICAL RECORD

Fifth Edition

ALTOGETHER NEW MATTER
EVERY QUESTION ANSWERED IN FULL

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PREFATORY NOTE

The present is the fifth edition of the MEDICAL RECORD series of State Board Questions and Answers, the first having been published in November, 1907. The fact that 13,800 books of the first four editions have been distributed—an average of over 3,300 of each edition—is an evidence that the work is appreciated. The MEDICAL RECORD began the publication of answers to the examination questions of the State Licensing Boards in December, 1906, and they have appeared in every second issue of the Journal since that time.

The work was undertaken in the hope that it would prove useful to the recent graduate in familiarizing him with the nature of the examination to which he must submit before obtaining the right to practise medicine, but unexpectedly it has proved interesting and profitable to many older members of the profession who have thereby kept themselves posted regarding recent discoveries, and have also found entertainment in testing themselves as to their continuing knowledge of the elementary branches.

As was explained when the series was begun, eleven years ago, these answers open no short and easy road to success in the examination, for the candidate is not likely to come across the identical question in his examination paper. The object of publishing them is only to acquaint the student with the general character of these examinations and to inspire him with confidence in the result of his trial. Of the 19 per cent. who fail each year, it is safe to say a third meet disaster by reason of fright which would have been averted by a study of the examination papers answered in this department of the MEDICAL RECORD. In the hope that this new edition will prove to be as useful as its predecessors in thus giving confidence to the recent graduate and removing from his ordeal, trying enough in itself, the terror of the unknown, the book is offered in the service of the junior members of the medical profession.

ALABAMA.

State Medical Licensing Boards.

STATE BOARD EXAMINATION QUESTIONS.

Alabama State Board of Medical Examiners.

ANATOMY.

1. How are cervical, thoracic, and lumbar vertebræ distinguished? Give the characteristics of the seventh cervical vertebra.
2. To what class of joints does the elbow belong? What bones enter into its formation and name three of its ligaments.
3. Name the muscles of the anterior tibial region, and describe the tibialis anticus.
4. Describe a nerve fiber.
5. Give the origin and course of the musculospiral nerve.
6. Describe briefly the structure of arteries and veins.
7. Name the branches of the external carotid artery. Give the origin, course, and distribution of the lingual artery.
8. Give in a general way the flow of blood through the systemic veins.
9. Name the terminal lymphatic vessels, and locate and describe the receptaculum chyli.
10. Give the structure of the stomach.

PHYSIOLOGY.

1. Discuss at length the means and methods employed by the human organism in protecting itself against infectious diseases.
2. What phenomena follow injury to and section of the pneumogastric nerve?
3. Discuss the function of the mucosa of the respiratory tract.
4. Discuss the distribution and function of the cerebrospinal fluid.
5. Discuss aphasia.
6. Discuss hunger and thirst.
7. How is the automatic action of the heart muscle supposed to be maintained?
8. Discuss the absorption of ingested fats.
9. What general conditions influence blood-pressure and blood-velocity?
10. Discuss the origin and significance of urea.

CHEMISTRY.

1. Define "chemical change" and "physical change."

2. Name, describe, and give source of two elements used in their elementary forms in medicine.
3. Describe hydrogen—how does it occur and how may it be prepared?
4. Describe carbon dioxide—give formula and state what relation it bears to the respiratory changes.
5. What is phenol—give properties and source?
6. In what tissue is iron an important constituent, and how is it combined therein?
7. Define "proteid" and name three proteids found in the human body.
8. Describe the method for the quantitative determination of urea.
9. How may occult blood be detected in the feces?
10. What are ptomaines and how may they be introduced into the body?

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, AND DIAGNOSIS.

1. Give the etiology of mucous colitis.
2. Give the etiology of scurvy.
3. Give the pathology of endocarditis.
4. Give the pathology of abscess of liver.
5. Give the symptomatology of erysipelas.
6. Give the symptomatology of heat-stroke.
7. Give the diagnostic symptoms of pellagra.
8. Name one variety of pernicious malarial fever and give its diagnosis.
9. Give the diagnosis of diabetes mellitus.
10. Give the differential diagnosis between appendicitis and ovaritis.

PHYSICAL DIAGNOSIS.

1. Name points for observation in the inspection of the thorax.
2. Name points for observation in the inspection of the abdomen.
3. Give the varieties or kinds of respiratory (breath) sounds and the explanation of each (adventitious sounds not asked for, such as râles, for example).
4. Give the varieties or kinds of voice sounds and the explanation of each.
5. Give the physical signs of bronchial asthma and their explanation.
6. Give the differential physical signs between a thoroughly compensating cardiac hypertrophy caused by mitral stenosis and one caused by aortic insufficiency, and the reasons for same.
7. Give the physical signs of pericarditis with considerable effusion and their explanation.

8. Give the physical signs of arteriosclerosis.
9. Give the method for the physical examination of the spleen.
10. Give the physical signs of a bladder distended with fluid.

(Optional, to be answered or not, as the applicant prefers): Make a diagnosis in the following hypothetical case: Right side—Absent movement; bulging intercostal spaces; absent fremitus lower three-fourths, increased upper fourth; flatness lower one-third; tympany middle and part of upper third, dullness remaining upper third; absent respiratory and vocal sound lower third; amphoric breathing and egophony middle and part of upper third; bronchial breathing and bronchophony remaining upper third; succussion positive. Left side—Exaggerated movement and respiratory sound and apex of heart to left of mammary line.

OBSTETRICS.

1. What changes take place in the circulatory apparatus of the fetus after birth?
2. What conditions may be mistaken for pregnancy?
3. How would you diagnose the death of the fetus *in utero?*
4. What are the results of retroflexion of the gravid uterus with incarceration?
5. What are the premonitory symptoms of eclampsia?
6. What precaution should be taken in the management of face presentations?
7. What precautions should be taken against septic infection during labor and in the puerperal state?
8. Describe the internal method of performing podalic version and what are the dangers to the fetus?
9. (a) Give the diagnostic points of value in breech presentation prior to rupture of the membranes. (b) Name and describe positions of breech presentation.
10. Describe briefly the operation of cesarean section.

GYNECOLOGY.

1. Give the etiology of metrorrhagia.
2. Give the effects of ŏophorectomy.
3. Give the names of the two most important muscles of female perineum.
4. What is meant by fibrosis of the uterus?
5. Describe the endometrium.
6. Name the conditions that cause sterility in the female.
7. What pathological conditions are caused by posterior displacement of the uterus?

8. Classify tumors of the uterus.
9. Describe one operation for procidentia uteri.
10. Give the contraindications for curettage.

SURGERY.

1. Give the cardinal rules for treatment of wounds.
2. Give the treatment of shock and the precautions that may be taken for its prevention.
3. Name the different forms of peripheral aneurysms and give treatment for different varieties.
4. Name the varieties of fistula in ano and give treatment for same.
5. Describe the treatment of a compound fracture of the femur.
6. Give the diagnosis and tell how to reduce a backward dislocation of the head of the femur.
7. Give diagnosis and treatment of empyema or pus in the pleural cavity.
8. Give symptoms and treatment of gallstones.
9. Give diagnosis and treatment of perforation of the intestine in typhoid fever.
10. Give symptoms of suppurative pyelitis.

HYGIENE AND MEDICAL JURISPRUDENCE.

1. Define hygiene.
2. What is immunity and how developed? What is susceptibility?
3. Give the differential diagnosis between scarlet fever and measles.
4. What effect does excessive exercise have on the heart? What effect does insufficient exercise have on the heart?
5. What is the difference between parasites and saprophytes?
6. If on examination colon bacilli are found to be present in the general water supply of a community, what fact does it establish? What steps, if any, should be taken to protect the community?
7. Give the prophylaxis of uncinariasis.
8. What are the methods of self-purification of large bodies of water?
9. What are the symptoms of acute poisoning from bichloride of mercury and the antidote?
10. Found, the dead body of a newborn infant. How can it be positively determined that the child was born alive?

DISEASES OF THE EYE, EAR, NOSE AND THROAT.

1. In complete ptosis how is the eye, or its appendages,

affected, and why? In complete facial paralysis how is the eye, or its appendages, affected, and why?

2. Give the differential diagnosis between acute catarrhal conjunctivitis and gonorrheal ophthalmia, and the general principles of management of each. Write two prescriptions for each.

3. Explain the normal reaction of the pupil. What is the condition of the pupil in iritis, and what the remedy? What is the condition of the pupil in glaucoma, and what the remedy?

4. State some conditions that would demand enucleation of the eyeball, and describe the operation.

5. Give the symptoms of complete obstruction of the Eustachian tube, of some standing, and explain briefly the measures to be employed for relief.

6. Give the symptoms, dangers, and management of acute purulent otitis media.

7. How would you diagnose and manage abscess of the antrum of Highmore?

8. Give the symptoms, diagnosis, and management of adenoids of the pharynx.

9. A person is eating and suddenly begins to struggle for breath and turns bluish in appearance; what would you suspect, and what would you do?

10. Give some of the indications for laryngotracheotomy and describe the operation.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Alabama State Board of Medical Examiners.

ANATOMY.

1. The *cervical vertebræ* are distinguished by possessing a foramen in the transverse process. Further, they are smaller than those in the other regions; they have no facets for the ribs; the spinous processes are generally short and bifid; the spinal foramen is large and triangular; the superior articular process is directed upward and backward, and the inferior articular process is directed downward and forward.

The *thoracic vertebræ* have a heart-shaped body with a facet or demi-facet on each side for articulation with a rib; the laminæ are broad and deep; the spinous process is long and points downward; the transverse processes are long and articulate with the tubercle of a rib; the superior articular process is directed backward and slightly outward; the inferior articulate process is directed for-

ward and slightly inward; the spinal foramen is smaller and circular.

The *dorsal vertebræ* have a large body, wider transversely, and with no facet or demi-facet; the laminæ are short and thick; the spinous process is horizontal; the transverse processes are "rudimentary"; the superior articular process is directed inward and slightly backward; the inferior articular process is directed outward and slightly forward; the spinal foramen is larger, and triangular.

The *seventh cervical vertebra* is characterized by possessing a very long and prominent spinous process which is thick, not bifurcated, and is nearly horizontal.

2. The *elbow-joint* is a ginglimus or hinge-joint. The *bones* which enter into its formation are the trochlea of the humerus, the greater sigmoid of the ulna, and the head of the radius. *Three of its ligaments* are: Anterior, posterior, and internal lateral.

3. *Muscles of the anterior tibial region* are: Tibialis anticus, Extensor proprius hallucis, Extensor longus digitorum, and the Peroneus tertius.

The *Tibialis Anticus* is situated on the outer side of the tibia. It arises from the outer tuberosity and upper two-thirds of the external surface of the shaft of the tibia, from the interosseous membrane and from the intermuscular septum; it is inserted into the inner and under surface of the internal cuneiform bone and the base of the metatarsal bone of the great toe. It is supplied by the anterior tibial nerve; it flexes the foot at the ankle-joint.

4. Nerve Fibers.—1. *Medullated Fibers.*—"Medullated nerve fibers usually consist of three parts: (*a*) axis cylinder, (*b*) medullary sheath, (*c*) neurilemma. An *axis cylinder* is a cell process that carries an impulse away from the nerve cell. It is a slender cytoplasmic process and may be very long, as is the case with the motor fibers that come from nerve cells in the anterior horn of the spinal cord and extend, without interruption, to muscles in the distal parts of the limbs. The axis cylinder presents a longitudinal striation, a fibrillar structure, that is supposed to be continuous with the cytoplasmic striation of the cell body. The fibrils are imbedded in a fluid protoplasmic substance, the neuroplasm, and the whole surrounded by a delicate membrane, the exolemma. Implantation cone is an elevation that is sometimes present at the junction of the axis cylinder and cell body. The *medullary sheath* (white sheath of Schwann) is a covering to the axis cylinder. This sheath never extends to the nerve cell, but begins a little distance from it. Nodes of Ranvier are constrictions of this sheath at regular in-

tervals. The smaller the fiber the greater the distance between these nodes. Long fibers are slender, with long distance between the nodes; short fibers are coarse, with short distance between nodes. The *neurilemma* is a thin structureless membrane that surrounds the medullary sheath. An oval nucleus is present in this sheath, midway between the nodes of Ranvier. At each node the neurilemma is constricted and touches the axis cylinder, which in turn may be slightly thickened at this point and may give off a collateral. Medullated nerve fibers with a neurilemma are found in the cranial and spinal nerves. Medullated fibers without a neurilemma are found in the brain and spinal cord. The neurilemma gives great strength to the fibers. Its absence in the brain and cord accounts for the pulpy soft nature of this tissue."

"*Non-medullated nerve fibers* with a neurilemma, but without a medullary sheath, mingle with the medullated fibers. The sympathetic system consists largely of non-medullated fibers. Terminal branched endings of an axis cylinder, called neuropodia, have neither medullary sheath nor neurilemma. The axis cylinder, just as it leaves its nerve cell, is likewise uncovered." (Hill's *Histology*.)

5. The *musculospiral nerve* is derived from the posterior cord of the brachial plexus, and originates from the sixth, seventh, and eighth cranial nerves. At first it is behind the axillary and brachial arteries; it winds around the humerus in the musculospiral groove with the superior profunda artery; it pierces the triceps muscle. At the elbow joint it divides into the radial and posterior interosseous nerves. It supplies the Triceps, Anconeus, Supinator longus, Brachialis anticus, and Extensor carpi radialis longior muscles.

6. An *artery* consists of three coats: The tunica interna, or internal coat; the tunica media, or middle coat, and the tunica adventitia, or external coat. The internal coat consists of a basement membrane, on which is a layer of endothelial cells. The middle coat consists of involuntary muscle fibers, between the layers of which are some elastic fibers. The external coat consists of connective tissue (white fibrous and yellow elastic). Between the two outer coats is an elastic membrane.

The *veins* also have three coats, but the external coat is thicker than the middle coat (the opposite condition prevails in the arteries); the veins often have valves.

7. *The branches of the external carotid artery* are: Superior thyroid, lingual, facial, occipital, posterior auricular, ascending pharyngeal, superficial temporal, and internal maxillary.

The *lingual artery* arises from the external carotid

artery; it runs upward and inward to the great cornu of the hyoid bone, then downward and forward beneath the hyoglossus muscle; it then runs perpendicularly to the tongue, and turns forward on the under surface of the tongue, going almost to the tip of the tongue under the name of the ranine artery.

8. "The *systemic veins* return blood to the right auricle of the heart through the superior vena cava, the inferior vena cava, and the coronary sinus. The two first named receive blood from the veins of the body and limbs and from most of the solid viscera. The coronary sinus receives blood from the veins of the walls of the heart alone. The veins of the body wall and limbs form two groups—(1) the superficial veins; (2) the deep veins. The *superficial veins*, which commence in the capillaries of the skin and subcutaneous tissues, lie in the superficial fascia, and are very numerous. They frequently anastomose with one another, and they also communicate with the deep veins, in which, after piercing the deep fascia, they terminate. They may or may not accompany superficial arteries. The *deep veins* accompany arteries, and are known as venæ comites. The large arteries have only one accompanying vein, but with the medium-sized and small arteries there are usually two venæ comites, which freely anastomose with each other by short transverse branches of communication. *Visceral veins* usually accompany the arteries which supply viscera in the head, neck, thorax, and abdomen. As a rule there is only one vein with each visceral artery, and, with the exception of those which enter into the formation of the portal system they terminate in the deep systemic veins." (Cunningham's *Anatomy.*)

9. The *terminal lymphatic vessels* are the thoracic duct and the right lymphatic duct.

The *receptaculum chyli* is a triangular pouch-like structure which forms the commencement of the thoracic duct. It is situated on the front of the bodies of the first and second lumbar vertebræ, to the right of and a little behind the aorta, and by the side of the right crus of the diaphragm.

10. "The *wall of the stomach* consists of four coats which, enumerated from without in, are: serous, muscular areolar, or submucous, and mucous membrane. The *serous coat* is a layer which is derived from the peritoneum. It is deficient only along the lines of the lesser and greater curvatures. The *muscular coat* consists of three layers of plain muscular fibers. Of these the bundles of the outer layer run longitudinally, those of the middle layer circularly, and those of the inner layer obliquely. The longitudinal and circular bundles become thicker and strong-

toward the pylorus, at which they pass into the corresponding layers of the small intestine; at the pylorus itself the circular layer is greatly thickened to form the sphincter muscle. The oblique fibers are only present in the left or cardiac part of the stomach. The *areolar or submucous* coat is a layer of areolar tissue, which serves to unite the mucous membrane loosely to the muscular coat; in it ramify the larger branches of the blood vessels and lymphatics. The *mucous membrane* is a soft thick layer, generally somewhat corrugated in the empty condition of the organ. Its inner surface is covered by long columnar epithelium cells, all of which secrete mucus. They are prolonged into the ducts of the glands, but when these divide to form the tubules the cells become shorter (cubical). The thickness of the mucous membrane is due to the fact that it is largely made up of long tubular glands the mucous membrane is formed of retiform with glands, which open upon the inner surface. Between the some lymphoid tissue. Externally it is bounded by the muscularis mucosæ, which consists of an external longitudinal and an inner circular layer of plain muscular fibers." (Schäfer's *Essentials of Histology.*)

PHYSIOLOGY.

1. The acidity of the gastric juice, the urine, and the vaginal secretion; the alkalinity of the blood; the bactericidal action of the blood and lymph; the agglutinating action of the blood; and the general power of the body to produce antitoxins.

2. *Injury to or irritation of the pneumogastric nerve* may cause: Palpitation, vomiting, coughing, a sense of suffocation, hoarseness, aphonia, laryngeal paralysis. *Division of one pneumogastric nerve* may cause few or no symptoms; but division of both nerves is followed by death due to paralysis of the laryngeal muscles.

3. The *mucosa of the respiratory tract* serves: To warm the inspired air, to moisten the inspired air, to remove injurious substances from the inspired air.

4. The *cerebrospinal fluid* is present in the ventricles of the brain, in the central canal of the spinal cord, and in the subarachnoid space surrounding the brain and the spinal cord. Its *function* is to protect the brain from injury and the circle of Willis from compression; it forms a water cushion on which the middle and posterior parts of the brain may rest; it minimizes shocks.

5. "The speech areas, four in number and in kind, are in the left hemisphere in righthanded persons and in the right in lefthanded persons. There are two types of aphasia, which is the loss of the power of speech, known

as motor and sensory aphasia. The motor speech center lies in the posterior part of the third frontal convolution (Broca's convolution), just in front of the center of the muscles of speech (hypoglossal and facial nerve centers). A lesion of the motor speech center causes motor aphasia, in which there is a loss of the word-forming power, although the tongue is movable and the patient may understand spoken and written language and knows what he wants to say. It is as if memory of the motor combinations essential to produce speech were lost.

"The power of writing is usually lost with motor speech. The probable location of its cortical center is in the posterior two-thirds of the first, and perhaps in the second, temporal convolution. A lesion here causes 'word deafness,' a sensory aphasia in which the memory of the sounds of words is lost so that they are not understood, though hearing may be normal.

"The visual speech center lies in the posterior part of the angular gyrus in the outskirts of the higher visual or the visuopsychic field. Word-blindness (alexia), or the loss of memory of printed or written language is caused by a lesion here, though sight itself may be normal.

"Thus the basis of language is a series of memory pictures (1) of the sound of words; (2) of their appearance; (3) of the effort necessary to enunciate them, and (4) to write their symbols. As these memory pictures are connected with each other and with others that make up the concept by subcortical association fibers passing between them, a lesion in any of these association tracts also leads to a defect of speech." (Woolsey, *Applied Surgical Anatomy.*)

6. *Hunger and Thirst.* "The seat of sensations of hunger is located in the epigastrium. The seat of sensations of thirst is located in the pharynx, and is quieted by intravenous injections of water. In every case it is admitted that hunger and thirst are but localized expressions of a general need of the blood for food and drink. The true seat of hunger and thirst is not known. In all cases it is acknowledged that thirst is more painful than hunger, and it is more urgent to satisfy thirst than hunger. A dog without food but supplied with water lives twice as long as a dog deprived of both food and water." (Ott's *Physiology.*)

7. *Automaticity of the Heart.*—"The question of the cause or causes of the automatic rhythmical contractions must be sought for whether the phenomenon turns out to be a property of the muscular tissue or of the nervous tissue of the heart. When we say that a given tissue is automatic we mean that the stimuli which excite it to

activity arise within the tissue itself, and are not brought to it through extrinsic nerves. In the heart, therefore, we assume that a stimulus is continually being produced, and we speak of it as the *inner stimulus*. Experiment and speculation have been directed toward unraveling the nature of this inner stimulus. Most of the physiologists who have expressed an opinion upon the subject have sought an explanation in the composition of the blood or lymph bathing the heart tissue, or in the products of metabolism of the tissue itself. Regarding this latter view there is nothing of the nature of direct experimental evidence in its favor. No product of the metabolism of the heart tissue capable of exerting this stimulating effect has been isolated. In regard to the former view, that the inner stimulus is connected with a definite composition of the blood or lymph, there has been considerable experimental work which is of fundamental significance. While the older physiologists paid attention mainly to the organic substances in the blood, it has been shown in recent years that the inorganic salts are the elements whose influence upon the heart beat is most striking. These salts are in solution in the liquid of the tissue, and are therefore probably more or less completely dissociated. Attention has been directed mainly to the influence of the cations, of which three are especially important, namely, the sodium, the calcium, and the potassium." (Howell's *Physiology*.)

8. *Absorption of fat.* "Fat is not absorbed as fat, but as glycerin and fatty acid or soap. It is generally accepted that the fatty acid set free in the intestine is dissolved by the bile salts, and in this way, together with the glycerin, is absorbed by the columnar cells, but that during absorption a lipase which is contained in the columnar cells re-synthesizes, by reverse action, the glycerin and fatty acid. In this way minute fat particles are found near the bases of the columnar cells, and these may be demonstrated by staining with a 1 per cent. solution of osmic acid. The fat globules are further taken up from the columnar cells by some of the lymphocytes, which are capable of exhibiting ameboid movements, and which are found in the lymphoid tissue between the columnar cells and the central lacteal. The fat is then deposited in the central lacteal by these ameboid cells, and in this way it gets into the general lacteal stream, and thence into the thoracic duct. The bile salts, which have been absorbed by the columnar cells, in all probability get into the portal vein radical, and in this way are taken back to the liver to be excreted again in the bile. After a fatty meal minute globules of fat may be demonstrated in the blood

plasma of an animal; but they disappear rapidly, possibly existing in a solution and invisible form adsorbed to the blood proteins before they are deposited in the fat depots of the body." (Lyle's *Physiology.*)

9. *Blood-pressure* is influenced by several factors, such as: The quantity of blood in the circulation, the force of the ventricular systole, the elasticity of the arterial walls, and the peripheral resistance.

HEART.	ARTERIOLES.	BLOOD-PRESSURE	BLOOD-FLOW.
Force constant..	Resistance increased	+	—
Force constant..	Resistance diminished	—	+
Force increased..	Resistance constant	+	+
Force diminished	Resistance constant	—	—
Force increased..	Resistance diminished	+ —	+ +
Force diminished	Resistance increased	— +	— —
Force increased..	Resistance increased	+ +	+ —
Force diminished	Resistance diminished	— —	— +

The *velocity of the blood flow* is largely influenced by the same factors as the blood-pressure, particularly the force of the ventricular systole and the peripheral resistance. The possibilities of the variations in these factors are shown in the preceding table from Waller, in which the plus sign denotes an increase, and the minus sign a decrease in effect.

10. *Urea* is the end-product of proteid metabolism, and is the most important of the nitrogenous excreta of the body. The quantity of urea excreted is an index of the amount of protein which has been broken down in the body. Most of the urea is formed in the liver, from (1) the amino acids which have been absorbed from the small intestine, and which are not needed by the body; and (2) from the ammonium carbonate which is derived from the tissues, and from the action of a uricolytic enzyme upon uric acid. These two sources give respectively what is known as *exogenous* urea and *endogenous* urea.

CHEMISTRY.

1. In a *physical change* the composition of the matter acted upon is not altered; in a *chemical change* the composition of the matter acted upon is altered.

2. *Two elements used in their elementary form in medicine:* (1) *Iodine* is a bluish gray solid occurring in scales; it is volatile, the vapor has a violet color and a peculiar odor. It may be prepared by burning kelp, extracting the ashes with water, removing the other salts and removing the iodine from the compounds in the mother liquor by

chlorine. (2) *Iron*, when pure, is a silver white, soft solid, and crystallizes in cubes or octahedra. Reduced iron is prepared by heating ferric oxide in hydrogen:

$$Fe_2O_3 + 3H_2 = Fe_2 + 3H_2O.$$

3. *Hydrogen* is a colorless, odorless, tasteless gas; it is the lightest substance known, and is a good conductor of heat and electricity; it does not support combustion or respiration. It occurs free in volcanic gases and in the gases of the stomach and intestines; also in combination in water, ammoniacal compounds, and many organic substances. It can be prepared by the action of diluted sulphuric acid on zinc:

$$Zn + H_2SO_4 + x\,H_2O = x\,H_2O + ZnSO_4 + H_2.$$

4. Carbon dioxide is a colorless, suffocating gas, with a faintly acid taste. It will neither burn nor support combustion; it is soluble in water. Its formula is CO_2. There is 0.04 per cent. of it in atmospheric air; but in expired air this is increased to 4.4 per cent.

5. *Phenol*, C_6H_5OH, is commonly called carbolic acid. It is a crystalline solid, occurring in long, colorless needles. It has a peculiar odor, and a burning taste; it is soluble in water, alcohol, and ether. It occurs in coal and wood-tar. It is made by heating phenyl iodide with potassium hydroxide:

$$C_6H_5I + KHO = KI + C_6H_5OH.$$

6. Iron is an important constituent of the blood; it is found in the hemoglobin of the red corpuscles.

7. Proteids are nitrogenous organic substances of very complex composition and of unknown constitution. They all contain carbon, hydrogen, oxygen, and nitrogen; and some contain, in addition, sulphur, iron, phosphorus, or some other element.

Three proteids found in the body: Hemoglobin, keratin, and mucin.

8. *Quantitative determination of urea:* "The specific gravity of the urine is carefully determined, as well as that of the liquor sodæ chlorinatæ. One volume of the urine is then mixed with exactly seven volumes of the liquor sodæ chlorinatæ, and, after the first violence of the reaction has subsided, the mixture is shaken from time to time during an hour, when the decomposition is complete; the specific gravity of the mixture is then determined. As the reaction begins instantaneously when the urine and reagent are mixed, the specific gravity of the mixture must be calculated by adding together once the specific gravity of the urine and seven times the specific gravity of the liquor sodæ chlorinatæ, and dividing the sum by eight. From the quotient so obtained the specific gravity of the mixture after decomposition is subtracted; every degree

of loss in specific gravity indicates 0.7791 gram of urea in 100 c.c. of urine. The specific gravity determinations must all be made at the same temperature; and that of the mixture only when the evolution of gas has ceased entirely." (Witthaus' *Manual of Chemistry.)*

9. *Detection of occult blood in the feces:* "Soften a portion of the stool with water, shake with an equal volume of ether to remove fat, and discard the ether. Treat the remaining material with about one-third of its volume of glacial acetic acid and extract with ether. Then apply the guaiac test (mix equal parts of ozonized turpentine and fresh tincture of guaiac which has been diluted with alcohol to a light sherry-wine color. In a test tube or conical glass overlay the liquid to be tested with this mixture. A bright blue ring will appear at the zone of contact within a few minutes if hemoglobin be present)." (Todd's *Clinical Diagnosis.)*

10. *Ptomaines* are basic, nitrogenous compounds produced from protein material body by the bacteria which cause putrefaction. They are generally introduced into the body as food.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, AND DIAGNOSIS.

1. *Etiology of mucous colitis:* Dysentery, diseases of the liver or heart, tuberculosis, nephritis, exhausting diseases, and indigestion.

2. *Etiology of scurvy:* Improper diet, the absence of fresh vegetables with the salts normally contained in them.

3. *"Acute simple endocarditis* may be prenatal as well as postnatal. In the former class of cases, the right side of the heart is usually involved, while in those instances observed after birth, the disease is most often limited to the left side. While the disease may attack the entire lining membrane of the heart it is especially marked at the valvular portions of the endocardium. The earliest change is that of hyperemia of the membrane rendering it red and swollen. As the inflammatory exudate is thrown out the surface of the valves become roughened and warty excrescences are formed. These verrucose formations are to be found on the auricular surface of the mitral valve and on the ventricular surface of the aortic valve at the line of contact of their leaflets, usually from 1 to 2 mm. from their free margin. These vegetations are produced by a proliferation of the cells of the adventitia and of the external connective tissue; fibrin from the blood is deposited on the formations, thus serving to increase their size. The excrescences are friable and may be easily detached or broken off and carried in the blood stream as emboli, to various parts of the body, particularly the left

side of the brain, the kidneys, and the spleen. If retained in position, fibrous tissue is eventually formed; the valves become thickened and contracted, producing chronic endocarditis. The leaflets may then become the seats of various infiltrations." (Hughes' *Practice of Medicine.*)

4. *Pathology of abscess of the liver.* "The liver is enlarged, swollen, and opaque, and presents the ordinary evidences of parenchymatous degeneration or cloudy swelling. In addition, in the cases of so-called multiple pyemic abscesses it exhibits a number of variously sized abscesses —usually small, but often coalescing to form larger, sometimes many-chambered cavities, with purulent contents. The so-called single, tropical, or amebic abscess of the liver is described by Manson as consisting at first of one or more grayish, ill-defined, anemic, circular patches, half to one inch or thereabouts in diameter, in which the lobular structure of the liver cannot be made out. A drop or two of reddish, gummy pus may be expressed from the necrotic patches. Later the center of these patches liquefies, and distinct but ragged abscess cavities are formed. An abscess thus commenced extends partly by molecular breaking down; partly by more massive necrosis of portions of its wall; partly by the formation of additional foci of softening in the neighborhood and subsequent breaking down of the intervening septa. These may involve almost if not an entire lobe, usually the right. The pus is usually thick, viscid, chocolate-colored and streaked with blood, and often contains large pieces of necrotic liver tissue. *Entameba dysenteriæ* may be found in more than one-half of the cases (in some of the other cases in the wall of the abscess). The ordinary pyogenic organisms are rarely encountered. A large abscess may consist of a suppurating hydatid cyst." (Kelly's *Practice of Medicine.*)

5. *Symptoms of erysipelas:* Sudden onset; high temperature; a sharply defined red patch on the skin which spreads in all directions, the edges being raised and hard; variable constitutional disturbance.

6. *Symptoms of heat-stroke:* Dizziness, feeling of oppression, nausea, headache, vomiting, high temperature, sometimes diarrhea, relaxation of muscles, loss of consciousness and convulsions. It generally occurs during exposure to the rays of the sun.

7. *Diagnostic symptoms of pellagra:* Anemia, gastric pain, diarrhea, salivation, mental and physical depression; an erythema that is bilateral and occurs on the exposed parts of the body; muscular spasms, neuromuscular pains, vertigo, headache, paralysis, melancholia, spinal tenderness.

8. *Pernicious estivoautumnal malarial fever* is diagnosed

by finding the specific protozoon in the blood of the patient. This form is caused by the *plasmodium præcox*.

9. *Diabetes mellitus* is diagnosed by the large quantity of urine, with sugar in it, great thirst, enormous appetite, muscular weakness, emaciation, and the acetone odor of the breath.

10. In *appendicitis* the pain is of sudden onset and is localized in the right iliac fossa; there is abdominal rigidity, chiefly of the right rectus muscle, and tenderness at McBurney's point; there are usually fever, nausea, vomiting, and constipation.

In *inflammation of the right ovary* the pain is not localized, but may be bilateral, and spreads to the vagina and rectum; there is no tenderness at McBurney's point; it is usually worse, just before the menstrual period, which sometimes affords relief; on vaginal examination the ovary is found to be tender.

PHYSICAL DIAGNOSIS.

1. *In inspection of the thorax*, one should note: The size, shape, and symmetry of the chest; the movements during respiration; the rhythm, force, and frequency of the heartbeat; the position of the apex; any pulsations or enlargements; beading of the ribs; the color of the skin, and any eruptions.

2. *In inspection of the abdomen*, one should note: The general nutrition, size, shape, movements, pulsations, retractions; color of skin, and eruptions; the presence of white or colored lines; enlarged superficial blood-vessels; peristaltic movements; distention, or new growths; and general retraction.

3. *The respiratory sounds.* "The respiratory murmur may be modified in intensity, rhythm, and quality. The modifications of *intensity* are puerile, exaggerated, or feeble respirations. The modifications of *rhythm* are asthmatic, emphysematous, and cogged-wheel or jerky respirations. The modifications of *quality* are bronchial, cavernous, and amphoric breathing. *Bronchial breathing* occurs in lobar pneumonia, phthisis, compensatory emphysema, tumor, syphilis, and infarct. Both inspiration and expiration are harsh and have a high-pitched (tubular) character. *Cavernous breathing* is low-pitched and blowing in character and is heard over cavities. *Amphoric breathing* is similar to the sound produced by blowing gently over the mouth of an empty jar. It is present in phthisical cavities, pneumothorax with patulous opening, and localized consolidation near a large bronchus." (*Pocket Cyclopedia.*)

4. *The voice sounds.* "*Vocal resonance* is increased over

the apex of the right lung in health and in phthisical and pneumonic consolidations. It is diminished in thick chest-walls, pleural effusions, emphysema, and pulmonary edema. *Bronchophony*, or exaggerated vocal fremitus, occurs in phthisis. *Pectoriloquy*, the complete transmission of the whispered words to the ear, is heard over phthisical cavities and in pneumothorax when the lung is patulous. *Egophony*, in which the voice has a nasal, trembling sound, is heard at the upper border of dullness in pleural effusions." (*Pocket Cyclopedia.*)

5. *Bronchial asthma.* "Physical examination during the attack reveals a distended chest, as the lungs are overfull of air which cannot be expired. Moreover, as the thorax is thus in the inspiratory position, its movements, in spite of the violent respiratory efforts, are extremely limited, and the diaphragm is lowered and almost immobile. The respirations are normal or decreased in frequency; inspiration is short and quick; the expiration is prolonged and wheezy because of the difficulty in expelling the previously inspired air through the narrowed tubes—an expiratory dyspnea. Percussion is normal or hyperresonant. On auscultation a multitude of sonorous and sibilant râles are heard, during both inspiration and expiration. Toward the close of the attack, and during its course if bronchitis coexists, moist râles of various sizes are perceived." (Butler's *Diagnostics of Internal Medicine.*)

6. In *mitial stenosis* there will be observed a presystolic thrill; the hypertrophy will be right sided; the left side of the heart will be of normal size; the second pulmonic sound may be accentuated.

In *aortic insufficiency* the murmur is diastolic; the left ventricle is hypertrophied; the arteries will be found throbbing; and the characteristic Corrigan pulse is present.

7. *Pericarditis with effusion.* "The physical signs are: Marked increase of the cardiac dullness; displacement of the apex beat; muffling of the heart sounds; displacement of other organs (if effusion be great). The shape of the dullness is characteristic. It is conical, the apex of the cone being truncated and situated at the level of the second rib, owing to the close attachment of the pericardium to the great vessels at this point. The apex beat is generally pushed upward and to the left. It lies, when it is palpable at all, distinctly within the left border of cardiac dullness, not, as in enlargement due to valvular disease, in close relationship to it. The marked distention of the pericardial sac surrounds the heart with fluid, and causes a dullness extending much beyond the limits of the organ itself. The amount of bulging and displacement of organs will, of course, vary with the amount of fluid pres-

ent. As resolution takes place the friction returns, and may be very coarse in character. Muffling of the heart sounds is not always present, and is not entirely due to the presence of fluid, for the fetal heart is quite distinctly heard through an amount of fluid greater than is usually present in pericarditis. The muffling is therefore due mainly to weakness of the cardiac muscle from accompanying myocarditis, although where the quantity of fluid is very great, in serous and chronic pericarditis, this may in part account for it." (Wheeler and Jack's *Handbook of Medicine.*)

8. *Physical signs of arteriosclerosis.* The arteries are tortuous and feel like a pipe-stem; the apex beat of the heart is powerful and may be displaced to the left; cardiac dullness is increased downward and to the left, owing to hypertrophy of the left ventricle; the first sound of the heart is apt to be loud and booming, and the second sound accentuated.

9. *Examination of spleen.* "A greatly enlarged spleen and more rarely one scarcely more than palpable may be seen to move with the respiration; furthermore, in any case of splenomegaly a marked prominence of at least the left upper quadrant is produced. Auscultation may reveal friction sounds in the presence of perisplenitis, or the organ may be anchored by adhesion, but it is ordinarily freely and directly movable with respiration, and palpation is the only method yielding important results. The position of the patient should be right lateral if minor enlargements are to be noted, as in typhoid fever or other acute infections, and the right hand should make pressure posteriorly while the left makes palpation. Abdominal distention defeats palpation save in great enlargement, and the normal spleen is not palpable. If greatly enlarged the dorsal position is to be preferred and the condition can hardly be overlooked, unless with a tense wall the careless or hurried examiner fails to get below the actual border or to distinguish between muscular resistance and the splenic mass." (Greene's *Medical Diagnosis.)*

10. In the case of a bladder distended with fluid there will be a tumor in the hypogastric region, dullness on percussion over the tumor, and the introduction of a catheter will cause the tumor to disappear.

Optional. Right-sided pleurisy with effusion.

OBSTETRICS.

1. *Changes that take place in the circulatory apparatus at birth:* The hypogastric arteries dwindle and become impervious; the Eustachian valve atrophies; the foramen ovale closes; the ductus arteriosus and ductus venosus b

come obliterated; the umbilical vein becomes obliterated and is afterward known as the round ligament of the liver.

2. *Conditions that may be mistaken for pregnancy:* Amenorrhea, ascites, fibroids, ovarian tumors and cysts, obesity, tympanites, subinvolution of the uterus, and pseudocyesis.

3. *Symptoms of death of fetus in utero:* Cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements are absent, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete milk. If the fetus has been dead for some time, crepitus of its cranial bones may be elicited.

4. *Retroflexion of the gravid uterus, with incarceration, may result in:* Constipation, irritability of the bladder, retention of urine, cystitis, pyelonephritis, rupture of bladder, sloughing of the uterus, peritonitis, exhaustion, and shock.

5. *Premonitory symptoms of eclampsia* are: Dizziness, disturbances of vision, flashes of light before the eyes, vertigo, headache, diminished secretion of urine with lessened output of urea and some albumin, and pain in the epigastric region.

6. If the chin is presenting anteriorly, expectant treatment may suffice; but care must be taken to observe that the chin does not rotate backward. Spontaneous version may occur, and the presentation becomes a vertex one. Failing this, or as a means of favoring this, postural treatment, such as Walcher's position, has been recommended. If, in spite of this, engagement has not occurred, cephalic version is indicated, care being taken not to rupture the membranes. If this is not successful, podalic version should be tried. If, after all these manipulations the child is still alive and the head is engaged, symphyseotomy is indicated; if the child is dead, craniotomy should be performed.

7. The aseptic management of normal labor aims to *prevent* infection. The prophylaxis consists in thorough disinfection of the *patient*, the *physician*, and the *instruments* and *appliances* employed. The simplest method is as follows: "The *patient*, at the beginning of labor, takes a tepid bath and is well scrubbed all over with soap and water. Then an enema of soap and water to empty the bowel; after the action of which the external genitals, thighs, buttocks, and abdomen are carefully washed with a 1:2000 bichloride solution, special attention being given to overlook no fold or fissure of the surface. The vaginal douche, of 2 per cent. creolin solution, or the weak solution of

bichloride of mercury formerly used before labor, has been abandoned, unless there be some already existing infection, when it may be used. The normal vaginal mucus is itself germicidal in some degree, as well as a useful lubricant, and should therefore be allowed to remain undisturbed. Moreover, washing out the vagina exposes the woman to some danger of infection from an unclean syringe. The *physician*, before making any examination or doing any operation, removes his coat, bares the arms to above the elbows, when the hands and arms are thoroughly scrubbed with soap, water, and a stiff nail-brush. Scrape the under surface of the nail-ends and the fissures surrounding the nails with some pointed instrument, not sharp enough to scratch, and having washed off all soap in some clean water, immerse the hands and leave the arms in a 1:2000 bichloride solution, and continue this last washing for ten minutes." (King's *Obstetrics.)*

Nothing should come in contact with the genitals of the patient that is not sterile; and examinations should be as few as possible.

8. "*Internal version* is done by passing one hand into the uterus, seizing and bringing down one or both feet. The cervix must be sufficietly dilated to allow the hand to pass. It should be done as soon as possible after the membranes have ruptured. If there is only slight retraction of the uterus it may be done, by an expert operator, by deeply anesthetizing the patient, but one who has not had much experience of the operation should not attempt it. If the uterus is firmly retracted it should never be attempted. The patient may lie on her left side, or preferably on her back. The right hand may be used in all cases, but in some the left one does better. It depends on which way the child is lying. Use the hand which will most easily reach the front of the child. Thus, if its back is toward the mother's right side, use your right hand, and if the back is toward her left, the left hand; but if you are not accustomed to working with your left hand always use the right. The hands and arms should be thoroughly sterilized, and well washed in lysol solution. Pass the hand in a cone shape to dilate the cervix, if it is not sufficiently dilated already, and pass the hand on to the front of the child, rupturing the membranes, if they are unruptured. As much of the liquor amnii as possible should be retained in the uterus by damming it back with the wrist. If a contraction comes on, spread your hand flat on the front of the child and wait until the uterus relaxes. If you do not do this the pressure upon your closed hand will almost paralyze it, and may cause rupture of the uterine wall. Catch one or both feet, making sure

it is a foot and not a hand. As soon as you get a foot, pull the leg down steadily into the vagina, if the uterus is quiescent, but if a contraction comes on, wait, spreading your hand out as before. The child's body usually rotates quite easily, unless the uterus is retracted round it. If version is attempted when the uterus is retracted, as in a transverse case, care must be taken to unhitch the shoulder from under Bandl's ring, if it is caught, but only an expert should undertake such a risky operation, and it should only be undertaken if there is a chance of saving the child's life. The final part of the delivery is carried out in exactly the same way as when the breech presents." (Jardine's *Delayed and Complicated Labor.*)

The *dangers to the fetus,* are:—Injury from the traction, asphyxia, and death.

9. In *breech presentation* the back of the fetus may be palpated to one side of the mother's abdomen, the head is found at the fundus of the uterus, and auscultation gives the heart sounds above the umbilicus. The breech is either above the brim of the pelvis, or else it fills up the pelvis so that pelvic palpation is impossible.

The *positions of breech presentation,* are:—Left sacro-anterior, right sacro-anterior, right sacro-posterior, and left sacro-posterior.

10. *Cesarean Section.* "Fluid extract of ergot, ℥xx, is injected into the thigh muscles just as the anesthesia is begun. The operator assures himself that there is no loop of intestine between the uterus and abdominal wall, beneath the field of incision. Should a coil of intestine be found there, it is pushed above the fundus. An assistant holds the uterus in central position. The skin incision extends one-third above and two-thirds below the level of the umbilicus. It is best made through the right rectus muscle. The external layer of the rectus sheath is divided, the muscular bundles separated with handle of scalpel and the fingers, and the deep layer of the sheath and the peritoneum divided after lifting them with tissue forceps. Bleeding vessels are controlled by gauze sponge pressure, or held by catch-forceps before opening the peritoneum. A short longitudinal median incision is made in the uterine wall beginning at the fundus, avoiding the membranes if still unbroken. This is extended downward with fingers, scissors, or scalpel to a total length of about six inches. The hand is thrust through the membranes and the child is extracted by the head or the feet, whichever is most accessible. In case of anterior implantation of the placenta, usually the hand may best be passed directly through it. The cord is clamped at two points with catch-forceps, cut between them, and the child is

passed to an assistant. The uterus slips out of the abdomen as the child is extracted, and the intestines are kept back with hot sterilized towels placed over the upper part of the incision. The coverings help also to protect the peritoneum from soiling. The uterus is wrapped in hot moist cloths. As a rule, it is better not to wholly eventrate the uterus. The placenta, if not spontaneously separated, may be peeled off by grasping it with one hand like a sponge. If the cervix is not sufficiently open for drainage, a large rubber tube or gauze strip is passed down through it and withdrawn from below. Irrigating or mopping the uterine cavity is unnecessary. Asepsis is promoted by leaving it as nearly as possible untouched. The peritoneum is sponged dry with the least possible friction or handling. The uterine wound is closed with deep No. 2 chromated catgut sutures at intervals of about 1/3 inch. They are given a wide sweep laterally through the muscular wall, falling short of the decidua. The peritoneal coat of the uterus is closed with a No. 1 continuous plain catgut suture, forming a welt over the deep suture line. The hemorrhage is inconsiderable and usually ceases with the introduction of the first sutures—a hypodermic of ergotole should be given before beginning the operation, and one of ergotole and pituitrin on the delivery of the child. Retraction of the uterus is ensured by manipulating it, if necessary, through a hot towel, or by faradism. When there has been much blood lost, a quart or two of warm sterilized 0.9 per cent. salt solution may be left in the peritoneum. The parietal peritoneum is closed with a plain running No. 0 catgut suture. Interrupted silkworm-gut sutures are then passed at intervals of about ¾ inch; through all but the peritoneum, from within outward. The fascia is brought together with interrupted No. 2 plain catgut sutures, or with a continuous suture. The silkworm-gut sutures are now tied. The abdomen is cleansed, and the wound covered with a dressing of several thicknesses of dry sterile cheesecloth; over this is placed a thick compress of sterile absorbent cotton. The dressings are secured with strips of zinc oxide adhesive plaster, and held in place by a Scultetus binder." (Polak's *Obstetrics*.)

GYNECOLOGY.

1. CAUSES OF MENORRHAGIA. *Constitutional:* Purpura, scorbutus, hemophilia, hepatic cirrhosis, over indulgence in food and alcoholic drinks. *Local and Vascular:* Uterine congestion and displacement, endometritis, subinvolution, fibroids, and other tumors.

2. *Effects of Oophorectomy:*—"The operation, if thor-

oughly performed, is followed generally by atrophy and consequent arrest of function in the uterus, and the precipitation of the menopause. The artificial production of this critical period gives rise to phenomena quite similar to those which characterize the natural menopause, except in most cases menstruation is arrested permanently at once. The popular impression that the operation unsexes the woman in a mental sense or renders her masculine is a mistake. The effect of the operation upon sexual desire is variable, but probably no more so than that of the natural menopause. The question of insanity as a result of the operation has been raised; it probably occurs no more frequently than after other operations of equal gravity, probably not oftener than with the natural meonopause." (Dudley's *Gynecology.)*

3. *Two important muscles of the perineum:*—The transversus perinei and the levator ani.

4. *Fibrosis of the uterus.*—"This is a morbid condition of the uterus which presents the following characters: The patients are usually multiparæ between thirty-five and forty-five years of age, but the condition is also met with in younger women, and in nulliparæ. They complain of menorrhagia which lasts from fourteen to eighteen days. At times the bleeding is so profuse as to place life in danger. The uterus is enlarged, and the cervix is hard to the touch. When the cervical canal is dilated the tissue of the cervix tears rather than stretches; the endometrium is quite smooth, but the walls of the uterus are hard and resisting, and the curette makes a harsh grating sound in passing over it, and brings very little tissue away. The structural changes are very striking; the uterus is larger than usual, and its walls are thick and tough. On section the arteries stand out prominently, exposing their thickened walls. On microscopic examination the muscle tissue of the uterus is seen to be replaced by an abnormal growth of fibrous tissue. The walls of the uterine arteries are very thick, and the lumina of the vessels much narrowed and sometimes obliterated. The glands of the endometrium are markedly atrophied, so that the mucosa presents a much thinner layer than the normal. The changes in the tissues of the uterus are analogous to the curious fibrotic changes which occur in the walls of the cardiac ventricles as a sequel of syphilis. In the uterus the changes are probably a remote consequence of septic endometritis." (Sutton and Giles' *Diseases of Women).*

5. "The *mucous membrane of the uterus* is thick, and consists of a lining of ciliated epithelium, supported on a vascular and very cellular fibrous tissue. Long tubular glands extend down into the muscular coat invading its

deep layer. In the cervix the glands are shorter, but more branched, and are lined by columnar mucus-secreting cells. Near the os uteri the epithelium becomes columnar, and passes at the orifice into the stratified squamous type. During menstruation the mucous membrane becomes congested, the surface becomes partially disintegrated, and an escape of blood takes place from the surface." *(Aids to Histology).*

6. The *most common causes of sterility in woman* are: Gonorrhea, absence or errors in development of any part of the genital tract, malformations of genitals, fistulæ, lacerations, obesity, alcoholism, pelvic inflammations, dyspareunia, inflammations of uterus, tubes, or ovaries, elongated cervix. The cause may not be in the woman, but in the man.

7. *Posterior displacements of the uterus may cause:* Menstrual irregularities (such as amenorrhea, dysmenorrhea, or uterine hemorrhages), abortion, leucorrhea, sterility, constipation or pain on defecation, neurasthenia, hysteria, and various reflex symptoms. The ovaries and tubes may be displaced or pressed upon; the uterus may be compressed, or dilated.

8. *Tumors of the uterus may be classified as follows:*

I. *Malignant:* Carcinoma, sarcoma, deciduoma malignum, endothelioma.

II. *Benign:* Fibromyoma, adenomyoma, polypi.

9. *Operation for procidentia uteri.* "An incision two or three inches in length is made immediately above the symphysis, and the fundus uteri is drawn forward by a volsellum. Three silkworm gut stitches are inserted through the abdominal parietes and peritoneum, and also through the body of the uterus just posterior to its axis. The stitches should include about ¾ inch of the uterine wall in their grasp, and go about ⅛ inch deep. On drawing them tight, the uterus is fixed forward against the abdominal wall and contracts adhesions. In some cases it may be desirable to scarify the uterine wall before tying the stitches, so as the better to determine adhesions. As a general rule the adhesions stretch somewhat, and hence allow a certain degree of play, but without the likelihood of a return of the displacement." (Rose and Carless' *Surgery.*)

10. *The contraindications to curettage* are: The possibility of pregnancy and malignant tumors.

SURGERY.

1. *The general rules for treatment of wounds:* Stop the bleeding; remove foreign bodies; make the part as aseptic as possible; coapt the edges; drain when necessary;

dress, and secure rest to the part; bring about reaction; ease the pain.

2. *Treatment of shock:* Place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermically, may be necessary for the relief of pain. Adrenalin solution is administered into the arterial system.

In surgical operations *shock may be largely prevented* by reassuring nervous patients, keeping the patient warm, the avoidance of the excessive catharsis, and semi-starvation that often prevail before operations, the administration of strychnine and atropine before operation, the avoidance of delay and undue handling of parts during the operation, prompt checking of hemorrhage, and by using the utmost gentleness.

3. *Aneurysms* are described as: Fusiform, sacculated, and dissecting.

For *fusiform aneurysm,* constitutional treatment alone is indicated.

For *sacculated aneurysm* there are several methods of treatment: Constitutional; compression of the artery; ligature of the main artery; Matas' operation of aneurysmorrhaphy.

For *dissecting aneurysm,* there is no treatment.

4. FISTULA IN ANO.—*Classification:* There are four varieties: (1) The *complete,* which opens into the rectum internally and on the perineum externally; (2) the *external incomplete,* or *blind external,* which opens on the perineum, but not into the rectum; (3) the *internal incomplete* or *blind internal,* which opens into the rectum but not on the perineum; (4) the *horseshoe* fistula, which extends around the rectum and opens on each side. The internal opening is generally between the two sphincters, but may be above the internal sphincter and below the external sphincter. There may be several pockets or side tracts extending in different directions.

Treatment: This consists in "the conversion of the fistula into an open wound so that it may heal from the bottom. A grooved director is passed through the fistula into the rectum, and the overlying tissues severed with a bistoury. The sphincter should never be cut more than once, because of the danger of incontinence. All branching sinuses likewise should be opened, and all fibrous tissue, with undermined skin, cut away with scissors. The bleeding is then checked, and the wound packed with iodoform gauze. If the fistula is lined with mucous membrane it must be completely excised. A blind external fistula may be excised and the wound sutured. A blind

internal fistula may be converted into a complete one and treated as above. The bowels are confined for the first three or four days, and the wound dressed after each defecation, being irrigated with creolin and repacked with iodoform gauze." (Stewart's *Surgery.*)

5. "In the treatment of compound fractures the main object is to render the wound aseptic and to give efficient exit to the discharges. For this purpose the patient should in all cases be anesthetized, the limb shaved, and thoroughly purified, and the wound enlarged and thoroughly washed out with some reliable antiseptic. It may be advisable to excise torn and dirty fragments of skin, muscle, and tendon, especially when dirt has been ground into them. Loose fragments of bone are removed and portions denuded of their periosteum may be taken away lest necrosis should ensue; where fragments retain any considerable connection with the soft parts they may be left without fear. When a sharp end of one of the fragments is protruding through a small opening in the skin it is first purified thoroughly before attempting its reduction and then replaced, after enlarging the wound in the skin, or a portion sawn off. Hemorrhage is dealt with in the usual way, and the fragments are placed as nearly as possible in their normal position. If the fragments can be brought accurately into position it is well to fix them by some mechanical appliance; but where the ends of the bone are much comminuted the small portions must be arranged in position as well as possible, and no attempt made to wire them. A good-sized drainage tube is inserted, and, if need be, counteropenings are made; the external wound is closed or not, according to circumstances, and dressed, and suitable splints are then applied. Under such a régime the majority of cases do well. Immovable apparatus may be used after a time, windows being left in the plaster casing to allow wounds to be dressed." (Rose and Carless' *Manual of Surgery.*)

6. In a *backward dislocation of the head of the femur* (on to the dorsum ilii), the head of the bone lies on the dorsum ilii; the acetabulum is empty; the great trochanter will be found above Nélaton's line; the leg is considerably shortened, and is also flexed, inverted, and adducted; the toes rest on the instep of the other foot, the femur crosses the opposite thigh at its lower third.

Treatment: The patient is placed on a mattress on the floor and anesthetized. The leg and thigh are flexed in the position of adduction. This rolls the head of the bone down to the lower part of the acetabulum. The leg is then circumducted outward and brought down straight; this carries the head through the rent into the acetabulum. Fail-

ing success by this method, the body must be fixed and direct upward traction must be exercised upon the flexed thigh. As a rule these maneuvers are successful; if not, extension by pulleys must be made use of.

7. EMPYEMA. *Symptoms:* Fever, sweats, chill, diminished breath sounds and vocal fremitus, impaired mobility of chest, dullness on affected side, heart displaced to opposite side, leucocytosis. *Diagnosis* is made by respiration, showing the fluid to be pus. *Treatment:* Aspiration, drainage, irrigation, resection of ribs (Estlander's operation), or resection of chest wall (Schede's operation).

8. GALLSTONES. *Symptoms:* "While the calculus remains free in the gall-bladder, usually there are no symptoms. Impaction of the stone in the common duct gives rise to intermittent jaundice, following sharp pain in the right hypochondriac or epigastric region, frequently radiating toward the right scapula, nausea, vomiting, sweating, depression, and often intermittent fever (Charcot's intermittent fever). When the stone is impacted in the cystic duct, jaundice is less common, but the hepatic colic is severe, and dropsy of the gall-bladder may occur. The diagnostic points are the age, sex, history of previous attack, with jaundice and intermittent fever, location of the pain, dark, amber colored urine, containing bile, and sometimes the finding of the stone in the feces."

Treatment "includes the relief of pain by morphine (gr. ¼) and atropine (gr. 1/125), hypodermically, inhalations of chloroform, hot applications, and blisters over the seat of pain, and, later, a saline purgative. During the interval the diet should be largely liquid, and drugs such as sodium phosphate, sweet oil, chloroform, piperazin, and mineral waters should be administered. Constipation should be avoided by giving fluidextract of cascara (3½) and glycerine (3½) every night. Lavage and rectal irrigation may be practised. If the attacks become more frequent and severe and medical treatment fails, surgical interference (cholecystotomy) is indicated." (*Pocket Cyclopedia.*)

9. *Perforation of the intestine in typhoid fever. Symptoms:* "When perforation occurs, violent pain develops. As a rule there are tenderness, rapid pulse, costal respiration, abdominal rigidity, vomiting, and shock. Usually there is temporary reaction from shock, the subnormal temperature giving way to a normal or to an elevated temperature. The vomiting in some cases becomes stercoraceous. There is constipation and sometimes dullness on percussing the flanks. The face is Hippocratic. The patient may die of the preliminary shock or may react and die subsequently of blood poisoning."

Treatment: "Death is practically certain without operation. Operation should be done at once, proper means being adopted to combat shock. In many cases a general anesthetic should not be given, but a local anesthetic should be employed. The incision should be made in the right iliac region and the colon should be first located and then the end of the ileum. By locating the colon we obtain a fixed point from which to begin our search for perforation, and by opening the abdomen in the right iliac region we come down at once onto the perforated gut in the vast majority of cases. When a perforation is found, it should be inverted with two layers of Halsted sutures. It is not wise to excise the ulcer. If the bowel is very badly damaged, resection can be considered, but it is usually wiser to make a temporary artificial anus. After finding a perforation and closing it, examine to see if there are others. Close every perforation, and if a point is found where the thinning of the bowel wall indicates that perforation is liable to occur, protect this point by inverting the area of ulceration by sutures. Clean the peritoneum by flushing with hot salt solution. Leave the wound open, insert strands of iodoform gauze, and establish tubular suprapubic drainage. Elevate the patient a little in bed and employ continuous proctoclysis of salt solution." (Da Costa's *Modern Surgery.*)

10. *Symptoms of suppurative pyelitis:* Chill, tenderness, and pain in kidney, fever, vomiting, headache, scanty urine containing pus, exhaustion, and uremia.

HYGIENE AND MEDICAL JURISPRUDENCE.

1. *Hygiene* is the science and art of all that concerns the preservation, promotion, and improvement of health, and the prevention of disease.

2. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic bacteria. Immunity may be either natural or acquired.

Natural immunity is this power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired immunity is this resistance acquired: (1) By a previous attack of the disease caused by the bacteria, or (2) by the person being made artificially insusceptible. The conditions which give immunity from the pathogenic action of bacteria are: (1) A previous attack of the disease; (2) inoculation, with small quantities of bacteria, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

Active immunity follows an attack of a certain disease

and secures immunity for that alone; or it follows inoculation of a virus weaker than necessary to cause the typical disease; or it follows inoculation by bacterial products apart from the organisms themselves.

Passive immunity is the term applied to the effect of a serum derived from an immunized animal and injected into one not immune.

Susceptibility is liability to infection; a loss or absence of immunity.

3. *Scarlet fever:* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent.

Measles: Period of incubation, ten to twelve days. Stage of invasion, four days. Character of eruption, small dark red papules with crecentic borders, beginning on face and rapidly spreading over entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present.

4. *Excessive exercise* leads to irregular action of the heart, hypertrophy of the heart muscle, increased rate of heart beat, and disturbance of the rhythmic action of the heart.

Insufficient exercise leads to degeneration of the heart muscle, and general weakening of the heart's action.

5. A *parasite* is an organism which lives in or on another living organism.

A *saprophyte* is an organism which derives its nourishment from dead matter.

6. The presence of the colon bacilli in a water supply denotes the presence of sewage in that water and indicates the possibility and probability of an epidemic of typhoid as soon as the first typhoid case (or typhoid carrier) comes to that locality. Proper arrangements for the hygienic disposal of sewage should be made at once; and the inhabitants should be instructed as to the danger, and as to the proper disposal of sewage.

7. *Prophylaxis of uncinariasis:* Children and adults should be made to wear shoes; proper toilet facilities should be provided, and their use enforced; bathing or wading in shallow water should be forbidden; a proper

water supply should be available for drinking purposes, and prompt recognition and treatment of all cases should be encouraged.

8. *Methods of self-purification of large bodies of water:* Sedimentation, precipitation, oxidation, dilution, the action of bacteria, and the action of water plants.

9. BICHLORIDE OF MERCURY. *Symptoms of acute poisoning:* "The nauseous, metallic taste is experienced during the act of swallowing. Within a few moments this is followed by an intense, burning pain in the mouth, throat, and stomach. The mouth and tongue are whitened and shriveled. There are vomitings of a white material, containing shreds of mucous membrane, and tinged with blood, and bloody stools. Salivation occurs if life be sufficiently prolonged. Death sometimes occurs early from collapse, accompanied by convulsions, or in deep coma; but in most fatal cases life is prolonged for from three to six days."

Antidote: "White of egg. The following precautions should be observed in its administration: Too much should not be given at one time, lest the precipitate be dissolved in the excess; the antidote should be followed by an emetic, to remove the precipitate before it shall have been dissolved by the acid and chlorides of the gastric juice." (Witthaus' *Essentials of Chemistry and Toxicology.*)

10. If respiration has taken place, the lungs will float on being put into water; if respiration has not taken place, the lungs will sink. Further, the lungs before respiration are situated at the back of the thorax and do not fill the cavity; whereas, after respiration they fill the whole cavity.

DISEASES OF THE EYE, EAR, NOSE, AND THROAT.

1. *Ptosis* is due to paralysis of the third cranial nerve. "The eyeball is almost immobile, the limitation of movement being upward, downward, and inward, with the upper end of the vertical meridian inclined inward, especially upon looking downward; the face is directed upward and toward the sound side, and the head inclined to the shoulder of the paralyzed side. There is slight exophthalmos on account of the paralysis of the three recti which normally draw the eyeball backward; the pupil is dilated and is immobile; accommodation is paralyzed; there is crossed diplopia—the false image is higher, and its upper end inclined toward the paralyzed side." (May's *Diseases of the Eye.*)

"In *paralysis of the facial nerve* the eyelids cannot be shut, and the cornea remains more or less exposed. When a strong effort is made to close the lids the eyeball rolls

upward beneath the upper lid. Epiphora is a common result of facial palsy. Severe ulceration of the cornea may result from the exposure." (Nettleship's *Diseases of the Eye.*)

2. ACUTE CATARRHAL CONJUNCTIVITIS. *Symptoms:* "Hyperemia, profuse lacrymation, epiphora, a profuse discharge, sensation of sand in the eye, and sometimes photophobia. *Treatment:* Astringent and antiseptic washes are of value. Ascertain the underlying cause, if possible, and remove it. Anointing the lids with pure or medicated vaseline every evening is necessary. Alum, tannic acid, silver nitrate, and zinc sulphate are valuable as astringents. In intractable cases a 50 per cent. solution of boroglycerid in glycerin should be applied once daily." (*Pocket Cyclopedia.*)

GONORRHEAL OPHTHALMIA. *Symptoms:* Swelling and redness of the eyes, the presence of a discharge which soon becomes purulent, the conjunctiva of the lids becomes thickened, the eyelids are edematous, pain is severe, and there is some fever.

Management: Protect the sound eye. Wash the eye carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped onto the cornea every night and morning. The eyes must be covered with a light, cold wet compress. The patient must be isolated, and all cloths and compresses used must be burned. In adults the irrigation must be frequent, about every half hour or hour.

3. The *normal pupil* is circular, regular in outline, and the two pupils are equal in size.

The *pupil in iritis* is contracted, sluggish, and irregular.

The *pupil in glaucoma* is dilated, oval, and immobile.

Treatment of iritis: Atropine, dionine, the application of leeches to the temples, hot fomentations, absolute rest in bed, protection from the light, light diet, purgatives, abstinence from alcohol, avoidance of all use of the eyes for near work, constitutional treatment varying according to the etiology, paracentesis, and iridectomy.

Treatment of glaucoma: Myotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

4. The *indications for enucleation of the eye* are: "(1) Injuries of the ciliary region when the eye is completely blind, or the traumatism so extensive that the form of the eyeball cannot be preserved; (2) traumatic iridocyclitis, to prevent or cure sympathetic ophthalmia; (3) severe pain in a blind eye; (4) iridocyclitis, phthisis

bulbi, and glaucoma, when accompanied by severe pain or inflammatory symptoms, and when the eye is blind or is certain to become so; (5) malignant tumors, either intraocular or epiocular, if they cannot be removed with retention of the eyeball; (6) anterior staphyloma, if the eye is blind, troublesome, and disfiguring; (7) panophthalmitis, after the suppurative stage is passed; (8) foreign bodies in the eye when they cannot be removed and cause irritation, or the eye is blind." (May's *Diseases of the Eye.*)

Enucleation of the eyeball is performed as follows: "A general anesthetic is generally given. After introduction of the speculum, the conjunctiva is divided all around the cornea, as close to its border as possible, and dissected back as far as the insertions of the recti muscles. A squint hook is passed beneath the tendon of the internal rectus, and the latter is divided with the strabismus scissors close to its insertion; then the other straight muscles are cut in the same way, together with the subconjunctival connective tissue for some distance beyond the equator. The points of the scissors must always be directed toward the eyeball and the latter stripped as clean as possible to avoid any unncessary removal of orbital tissue. Instead of commencing with a circumcorneal division of the conjunctiva, we may begin with a tenotomy of the internal rectus and then divide the conjunctiva as we pass from tendon to tendon. The hook is passed around the globe to make sure that the attachments of the muscles have been completely divided. The eyeball is then dislocated forward by pressing the speculum backward, and thus the optic nerve is put on the stretch. A pair of enucleation scissors, closed, are passed between sclera and conjunctiva, feeling for the optic nerve; they are withdrawn, slightly opened, and the nerve is divided close to the sclera. The eyeball is held between the thumb and index finger of the left hand, and the oblique muscles, and other unsevered attachments are divided. The orbit is plugged for a few minutes to control hemorrhage, and the conjunctiva is usually closed with a single suture, which is passed through its edge at intervals and tied like the string of a pouch. The eye is bandaged and the patient kept in bed for a day." (May, *Diseases of the Eye.*)

5. The mouth is apt to be kept open; mouth-breathing is common; enlarged tonsils or adenoids or both are probably present; the patient suffers from deafness, or partial deafness. *Treatment*: Remove adenoids and enlarged tonsils; inflate with a Politizer bag or use a Eustachian catheter.

6. In *active suppurative otitis media:* "Pain (lessened

when drum perforates), fever (100° to 104° F.), tinnitus, deafness (usually partial only), and purulent discharge (after perforation). *Treatment:* Dry heat allays the pain. Warmed water or warmed carbolic acid solution (1:40) may be used. Inflations, aspirations, etc., should be avoided. If the nares are filled with tough secretions, a spray of Dobell's solution may be used. If the pain continues over six hours in a child or over twelve hours in an adult without spontaneous perforation of the tympanic membrane, paracentesis of that structure should be performed. The concha and meatus should be smeared with petrolatum to avoid chapping, and the secretions should be gently mopped off as they appear. Under this treatment the ear usually returns to normal in two to three weeks." *(Pocket Cyclopedia.)*

7. *"Abscess or empyema of the antrum of Highmore* is a collection of pus within the maxillary antrum. It results from inflammation of the jaws, the teeth, or the mucous membrane of the nose. It causes pain, edematous swelling of the overlying soft parts, and crepitation on pressure upon the superior maxillary bone. Pus may escape from the nostril of the diseased side when the head is bent in the direction of the healthy side. A rhinoscopic examination discloses the fluid passing into the nares. The antrum on the side of the abscess cannot be transilluminated by an electric light in the mouth. The constitutional symptoms of suppuration usually arise. *Treatment:* Bore a gimlet-hole through the superior maxillary bone, above the canine tooth, or perforate the bone by means of a trocar. Irrigate daily with boiled water or normal salt solution. Keep the opening from contracting by inserting a small tent of iodoform gauze. In persistent cases it may be necessary to draw a tooth, break through the socket of the first or second bicuspid into the antrum, and insert a silver or hard-rubber tube, and also to perforate the antrum from the inferior meatus and keep the opening patent. In very persistent cases osteoplastic resection of a portion of the upper jaw will be demanded." *(Da Costa's Surgery.)*

8. *The symptoms of adenoids* are: Mouth-breathing, snoring, open-mouth, a vacant, dull expression of the face, modification of the voice (nasal twang), with inability to pronounce certain letters. *Effects:* Earache and other ear affections, mental deficiency, frequent attacks of coryza, nose-bleed, stunted growth, convulsions, laryngismus stridulus, and various other neuroses may also be noticed. *Diagnosis* is made by rhinoscopy, and by feeling the adenoids with the forefinger behind the palate. As the growths bleed easily, the examining finger will be found

covered with blood. *Treatment* consists in thorough removal by a curette.

9. A piece of meat (or other food) is probably impacted in the pharynx or esophagus.

First of all, an attempt may be made to dislodge it by means of the fingers. If it is beyond the reach of the fingers forceps may be used. If suffocation seems imminent laryngotomy must be done at once. If unsuccessful with the forceps, an attempt may be made to push the mass into the stomach, with a probang. If these methods fail and the impaction is in the upper part of the esophagus, esophagotomy is indicated; if in the lower part of the esophagus, gastrotomy is necessary, and the foreign body may be reached and removed by forceps or fingers introduced through the cardiac orifice of the stomach.

10. *Laryngotracheotomy* is indicated in diphtheria when intubation does not relieve and the symptoms are urgent; to remove foreign bodies from the larynx that cannot be treated by simple methods; to provide passage for air, in growths, tumors, or abscesses pressing on the larynx and interfering with the proper supply of air, and for edema of the glottis when the intubation tube cannot be introduced. "*Laryngotracheotomy* consists in making an incision into the air-passages by dividing one or two of the upper rings of the trachea, the cricotracheal membrane, the cricoid cartilage, and the cricothyroid membrane. This operation is employed in cases where, from the age of the patient, the cricothyroid space is too small to admit of a sufficient opening, or in those in which, for any reason, the surgeon does not deem it advisable to attempt to open the trachea lower down. The incision in the skin and superficial fascia of the neck is made in the same manner as in the operation of laryngotomy, but is carried a little further downward. It may be necessary to displace the isthmus of the thyroid gland downward to expose the upper portion of the trachea, and when the trachea is exposed the incision should be made through this and the cricoid cartilage from below upward. A tracheotomy tube is introduced through the wound and secured by tapes tied around the neck." (Wharton's *Minor and Operative Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

Arkansas State Medical Board.

ANATOMY.

1. In the anatomy of the brain, what is the corpus callosum? Describe its connection.

2. Describe the esophagus as to (*a*) location, (*b*) dimension, (*c*) arterial supply.
3. Give the anatomy of the bladder, including blood and nerve supply.
4. Give origin, course, and distribution of the great sciatic nerve.
5. Name the bones of the head.
6. Describe the prostate gland and give blood and nerve supply.
7. What muscles assist in (*a*) mastication, (*b*) deglutition?
8. Give the gross and topographic anatomy of the pancreas.
9. Describe the triangle of the elbow and name the structures that pass through it.
10. Give the distribution of the radial nerve below the wrist.

PHYSIOLOGY.

1. Describe (*a*) the hemoglobin of the blood. (*b*) Give its function. (*c*) State what takes place from the inhalation of coal gas upon the hemoglobin of the blood.
2. Define (*a*) the term "blood pressure." (*b*) What factors govern normal blood pressure?
3. Compare flow of blood through an artery and vein.
4. Why is respiration stopped during the act of swallowing?
5. Name four necessary constituents of food essential to health.
6. During the absorption of carbohydrates, in which set of blood vessels is the percentage of sugar the highest?
7. Under what circumstances may the quantity of urine, in health, fall considerably below the average?
8. Give the number of layers of the wall of the small intestine and describe each layer.
9. Give location, structure, and function of the pituitary body.
10. Name the principal columns of the spinal cord and give functions of each.

CHEMISTRY.

1. Define (*a*) matter. (*b*) Name three properties of matter.
2. Define (*a*) a molecule. (*b*) Define an atom.
3. Define (*a*) an element. (*b*) Name five, giving symbol of each.
4. Name (*a*) elements comprising halogen group. (*b*) Give one equation for producing chlorine.
5. Give (*a*) symbol, atomic weight, and valence of

oxygen. (*b*) Give one equation for producing oxygen.
6. Name (*a*) two alkali metals. (*b*) Give symbol for a salt of each.
7. Give symbol, properties and one method of obtaining mercury.
8. Name the different forms in which carbon exists in the free state.
9. Describe three tests for detecting albumin in urine.
10. Describe Fehling's test for sugar in urine.

GYNECOLOGY.

1. Give treatment for chronic endometritis.
2. What advice would you give a young woman regarding dress?
3. Describe surgical treatment for umbilical hernia.
4. Give symptoms of carcinoma of cervix.
5. Give symptoms and treatment of acute pelvic cellulitis.
6. Give reasons for dilatation of cervix.
7. Indications for and technique of uterine curettement.
8. Name conditions which justify an operation during pregnancy.
9. Give symptoms following malpositions of uterus.
10. Give technique of repairing a lacerated perineum.

MATERIA MEDICA.

1. What is (*a*) the source of carbo animalis? *b*) Carbo ligni? (*c*) How are they prepared? (*d*) Give dose and uses of each.
2. Give properties and untoward effects of sulphonal.
3. Give properties of potassium chlorate, potassium carbonate and potassium acetate. (*b*) What is the composition of potassa cum calce (Vienna paste)?
4. Name four antiperiodics.
5. What do you understand (*a*) by physiological antagonism of drugs? (*b*) Give two examples.
6. From what is (*a*) phosphorus obtained? (*b*) Give its properties.
7. Name (*a*) the official chlorides of mercury; (*b*) the iodides.
8. What are (*a*) protectives? (*b*) Give several examples.
9. Give properties and physiological action of ethyl alcohol.
10. Why should we not keep morphine in solution?

THERAPEUTICS.

1. What remedies would you use (*a*) in mucous diarrhea? (*b*) In serous diarrhea? (*c*) In diarrhea due to glandular deficiency?

2. Give therapeutics of argentum nitrate.
3. How would you use (*a*) iodine in goiter? (*b*) What other remedies may be used?
4. How would you use (*a*) pilocarpine in erysipelas? (*b*) What other remedies would you use?
5. What precautions should we use in administering quinine intravenously and intramuscularly?
6. What remedies do you use, and how do you apply them in puerperal infection?
7. What foods would you prescribe for the nursing mother (*a*) to increase milk fat? (*b*) to decrease milk fat?
8. Give therapeutics of phenol.
9. What remedies are usually used (*a*) in insolation? (*b*) Why is venesection beneficial?
10. How is biniodide of mercury best administered in chronic paludism?

PATHOLOGY.

1. What is Pathology?
2. Name the diseases from which pleuroempyema may result.
3. Describe the abnormal structural changes that may occur in the prostate gland and assign cause for same.
4. Define (*a*) toxemia. (*b*) Give symptoms and explain how toxins are disposed of in the animal body. (*c*) Differentiate intoxication and infection.
5. What pathological conditions of bone may result (*a*) from a fracture or contusion? (*b*) Name the possible sequelæ of a severe contusion of the cranium.
6. Give cause and pathology of a follicular ovarian cyst.
7. Describe and give cause of adenoid development in children.
8. Give causes of deafness, and explain how it is produced pathologically.
9. Give significance of indican and skatol in the urine.
10. Describe the symptoms and explain the pathogenesis of acute anterior poliomyelitis.

BACTERIOLOGY.

1. What is Bacteriology?
2. How are bacteria recognized?
3. Explain the effects of age upon a culture of bacteria.
4. Describe the chief morphological characteristics (*a*) of the organism producing cerebrospinal meningitis. (*b*) Describe method of diagnosing miscroscopically, give culture-media, time for growth, stains used, and

technique of staining. (*c*) Name the varieties of meningitis from a bacteriological standpoint.

5. What is meant (*a*) by the term "physiological leucocytosis?" (*b*) Give a few examples of same.

6. Give technique of staining malarial plasmodium.

7. Define ptomains and toxins.

8. Name and describe the organisms that produce the following diseases: Furunculosis, diphtheria, syphilis, and pneumonia.

9. Describe in detail the examination of sputum for tubercle bacilli.

10. Discuss the reliability of the following tests: Widal test for typhoid; Wassermann reaction for syphilis; Von Pirquet's test for tuberculosis.

THEORY AND PRACTICE.

1. Define (*a*) malaria. (*b*) Give best method of prevention and treatment for an ordinary case.

2. Give the symptoms and treatment of acute tonsilitis.

3. Name three complications of typhoid fever and give treatment of each.

4. Give symptoms, complications, and treatment of chronic interstitial nephritis.

5. Differentiate between follicular tonsilitis and diphtheria.

6. Give cause and treatment of tetany.

7. Differentiate between tuberculosis with consolidation and pleurisy with effusion.

8. Give dietetic and medicinal treatment of ileocolitis.

9. Define acidosis and name diseases in which it may occur.

10. Give symptoms, complications, and treatment of otitis media.

OBSTETRICS.

1. Define fecundation and describe its physiology.

2. State the most important signs of pregnancy up to the fourth month.

3. Name the various diameters of the fetal head.

4. What is the placenta? From what is it formed, what is its structure and what are its functions?

5. What preliminary preparation would you suggest for a case of labor?

6. How would you diagnose the death of the fetus in utero?

7. Define abortion, miscarriage, and premature labor.

8. How would you diagnose and manage a case of occipitoposterior presentation?

9. How should a hand presentation be managed?

(What course would you pursue if you found a hand projecting from the vulvar orifice?)

10. Give the varieties, symptoms, and treatment of puerperal mastitis.

SURGERY.

1. Give symptoms, diagnosis, and treatment of Pott's disease.

2. Differentiate intussusception from acute appendicitis? Give treatment for intussusception?

3. Give causes, symptoms, and treatment of ischiorectal abscess.

4. In what diseases is splenectomy indicated? Give the characteristic blood picture of any one of these pathological conditions, and describe the operative technique for removal of spleen.

5. What pathogenic microorganisms are more frequent causes of wound infections? State in detail how you would treat an infected wound of the soft parts.

6. Give causes of delayed union in fractures. State how you would determine that such existed and the best method of treatment.

7. What are some of the dangers of injuries which penetrate the knee joint. How would you avert them?

8. Give indications for decompression operation on skull. State in detail operative technique.

9. Give causes and treatment of chronic osteomyelitis. What degenerative condition of the kidney arises in long continued suppuration of bone? Also give treatment for this complication.

10. Describe how you would ligate the common carotid artery in superior carotid triangle, the structures you would go through, and what complications may arise from ligation.

HYGIENE.

1. State the dangers of excessive weeds and shade about dwellings.

2. What advice would you give a community in regard to obtaining pure drinking water?

3. Name precautions that should be observed around all public drinking places.

4. Name (*a*) five preventable diseases. (*b*) State why preventable.

5. Name (*a*) the diseases to which the negro is comparatively insusceptible. (*b*) Name diseases to which the negro is more susceptible than the whites. (*c*) State reason for above.

6. Why is the prevalence of smallpox and diphtheria considered greater in cold than in warm weather?

7. What hygienic precautions should be observed with patient and community during an epidemic of polio myelitis?

8. What hygienic means should be employed in a house where there is pellagra?

9. From what are (*a*) ptomains derived? (*b*) What disorders are produced by them?

10. Name precautions that should be observed as to food and drink by those working under the direct rays of the sun in the summer.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Arkansas State Medical Board.

ANATOMY.

1. The *corpus callosum* is the great transverse commissure which unites the two cerebral hemispheres. It is situated at the bottom of the great longitudinal fissure, its upper surface forming the floor of this fissure; its under surface is connected in front with the septum lucidum, and behind with the fornix; the posterior end lies over the mesencephalon and extends backwards as far as the highest point of the cerebellum. It forms the roof of the lateral ventricles.

2. The *esophagus* extends from the pharynx to the stomach; it begins at the lower border of the cricoid cartilage opposite the sixth cervical vertebra, and passes down along the front of the spine, behind the trachea and pericardium to end in the stomach at a point opposite the eleventh dorsal vertebra. It is about ten inches long, and from half an inch to an inch in diameter. Its arterial supply is derived from the inferior thyroid branch of the thyroid axis, the descending thoracic aorta, bronchial arteries, from the gastric branch of the celiac axis, and from the left inferior phrenic of the abdominal aorta.

3. The *male bladder* is a musculo-membranous pouch, situated in the pelvis, behind the pubes and in front of the rectum. It has a superior surface, antero-inferior surface, two lateral surfaces, a base or fundus, and a summit or apex. It is retained in its place by the two anterior ligaments, two lateral ligaments, and the urachus; there are also five false ligaments formed by folds of the peritoneum. Internally, on the floor, is the trigone, between the openings of the two ureters and the urethra. The anterior part of the bladder is uncovered by peritoneum, and is in relation with the

triangular ligament, the symphysis pubis, and the pubo-prostatic ligament. Above it is covered with peritoneum and is in relation with the rectum and small intestines. The base is in relation with the rectovesical pouch, vasa differentia, and seminal vesicles, all of which separate it from the rectum. It is supplied by the superior, middle, and inferior vesical arteries; and the pelvic plexus of the sympathetic, and the third and fourth sacral nerves.

4. The *great sciatic nerve* arises from the sacral plexus, and passes out of the pelvis through the great sacrosciatic foramen, below the pyriformis muscle; it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus, and adductor magnus muscles.

5. The *bones of the head* are: Occipital, two parietal, frontal, two temporal, sphenoid, ethmoid, two nasal, two superior maxillary, two lacrymal, two malar, two palate, two inferior turbinated, vomer, and inferior maxillary.

6. *Prostate gland* is about 1½ x ¾ x ½ inches, and weighs about three-quarters of an ounce. It resembles a chestnut in size and form. It is situated at the neck of the bladder, and surrounds the first part of the urethra. It consists of fibromuscular (unstriated) tissue with imbedded follicular pouches, the whole enclosed in a firm fibrous capsule, continuous in front with the triangular ligament, and behind with the posterior layer of the deep perineal fascia. *Arteries* are from the vesical, hemorrhoidal, and internal pudic. *Nerves* are derived from the hypogastric plexus.

7. *Muscles of mastication:* Masseter, temporal, external pterygoid, internal pterygoid, and buccinator. *Muscles of deglutition:* Buccinator, hyoglossus, styloglossus, palatoglossus, palatopharyngeus, azygos uvulæ, tensor palati, levator palati, stylopharyngeus, stylohyoid, geniohyoid, mylohyoid, thyrohyoid, digastric, constrictors of pharynx, and the intrinsic muscles of the tongue.

8. The *pancreas* is long and irregularly prismatic in shape; it has been compared to a human or dog's tongue. The right extremity is called the head, which fits into the curve of the duodenum; the left end is called the tail and reaches to the spleen. The stomach lies in front of the body of the pancreas, and the transverse colon and its mesentery cross the lower end

of the head, which is also in relation to the superior mesenteric vessels. Behind the pancreas are the superior mesenteric artery and vein, portal vein, inferior vena cava, aorta, crura of diaphragm, left kidney with its suprarenal capsule. Below are the jejunum, the duodenojejunal junction, and the splenic flexure of the colon. Above the neck is the pyloric end of the stomach. The pancreas lies across the front of the first and second lumbar vertebræ, behind the stomach, and in the epigastric and left hypochondriac regions. Its canal is the duct of Wirsung, which extends transversely from left to right and opens into the duodenum in common with the ductus communis choledochus.

9. The *triangle at the elbow* is bounded above by an imaginary line between the two condyles of the humerus, externally by the inner edge of the supinator longus, internally by the outer margin of the pronator radii teres; the floor is formed by the brachialis anticus and supinator brevis. The space contains the brachial artery with its accompanying veins, the radial and ulnar arteries, the median and musculospiral nerves, and the tendon of the biceps.

10. Below the wrist, the *radial nerve* supplies the skin of the radial side of the ball of the thumb, and the back of the index, middle, and adjoining half of ring fingers (except the terminal phalanx).

PHYSIOLOGY.

1. The *hemoglobin* is the coloring matter of the red corpuscles; it is a crystalline body of complex structure, whose exact percentage composition has not been determined. It contains carbon, hydrogen, nitrogen, oxygen, sulphur, and iron. It constitutes over 90 per cent. of the red blood corpuscles, and it is owing to this substance that these corpuscles are capable of carrying oxygen to the tissues of the body. It has a great affinity for oxygen; this is due to the presence of iron. Its *function* is to carry oxygen from the lungs to the tissues. When coal gas is inhaled, the hemoglobin promptly takes up the carbon monoxide, for which it has a much greater affinity than for oxygen, and with which it forms a much more stable compound; the carbon monoxide also makes the blood of a cherry red color.

2. *Blood pressure* is the force exercised by the blood against the walls of the blood vessels. It is regulated by the force and frequency of the ventricular systole, the quantity of blood contained in the vessels, the elasticity of the walls of the arteries, and the resistance in the capillaries.

3. The flow of blood in the *arteries* is intermittent, at higher pressure, and at a greater velocity than in the veins; in the *veins* it is more continuous, at a lower pressure and at a slightly lower velocity than in the arteries; in the *veins* it is also assisted by the contraction of muscles, the action of the valves, and the aspiration of the thorax.

4. The inhibition of respiration during swallowing is the result of a reflex, the afferent nerve involved being the glossopharyngeal.

5. *Four necessary constituents of food essential to health:* Proteins, fats, carbohydrates, and inorganic salts.

6. During the absorption of carbohydrates, the percentage of sugar is highest in the portal vein.

7. The quantity of urine, in health, may be decreased in amount: In hot weather, during exercise, after profuse sweating, when much fluid is lost by the bowel, when there is a diminished intake of fluid.

8. "*The small intestine* has four coats, mucous, submucous, muscular, and serous. The mucous membrane is characterized by the presence of long finger-like processes, the villi. Between the villi are numerous depressions, the crypts or glands of Lieberkühn. The villi are covered by columnar epithelium, showing a striped free border, and interrupted at frequent intervals by goblet cells. The epithelium is set on a basement membrane. The core of the villus is supported by retiform tissue. In this there is a central lacteal, a network of capillaries, and some visceral muscle fibers prolonged into the villus from the muscularis mucosæ. A good many leucocytes, especially lymphocytes, are present in the villi. The Lieberkühn's follicles are lined by epithelium continuous with that of the villi. At the base of the follicles the cells have a specially granular character, and frequently show mitotic figures. These are cells of Paneth. In the reticular tissue are lymphoid nodules, the solitary glands of the intestine. At the lower end of the ileum the lymphoid nodules run together and form large masses. These may rupture through the muscularis mucosæ, and proliferate in the submucosa. These are the Peyer's patches. The muscularis mucosæ, bounding the mucous membrane, consists of an inner circular and an outer longitudinal layer of visceral muscle. The submucosa is a loose fibrous tissue containing the plexus of Meissner. In the duodenum there are glands of Brunner in the submucosa. There are racemose glands lined with epithelium of the serous

type. Their ducts pierce the muscularis mucosæ, and open either into or between the glands of Lieberkühn. In the ileum, at its lower part, there are masses of lymphoid tissue, the Peyer's patches. The muscular coat is composed of a thick layer of circular plain muscle fibers internally, and a thinner longitudinal layer externally. Between them is a small amount of loose fibrous tissue in which Auerbach's plexus lies. The serous coat is derived from the mesentery." (From *Aids to Histology.*)

9. The *pituitary body* is situated on the floor of the skull, on the sella turcica of the sphenoid bone. It consists of two lobes, an anterior and a posterior, and is connected by the infundibulum with the third ventricle of the brain. The posterior lobe originates from the brain, and is composed of neuroglia; the anterior lobe is derived from the buccal epithelium. Between these two lobes is the pars intermedia which invests the posterior lobe but is itself developed from the anterior lobe. *Function:* Complete removal of whole gland or of anterior lobe is followed by death; the anterior lobe is connected with growth, if the gland hypertrophies there follows overgrowth of the skeleton, and partial removal leads to failure of development of the body as a whole and of the sexual glands. The posterior lobe is believed to cause constriction of arterioles, rise of blood pressure, contraction of the involuntary muscles in many viscera, increased flow of urine, and increased secretion of milk.

10. PRINCIPAL COLUMNS OF THE SPINAL CORD. 1. In the *posterior column*, are (*a*) Posterointernal column (or column of Goll), which conducts to the brain special sensations from muscles, tendons, and joints of the same side; (*b*) Posteroexternal column (or column of Burdach), which conducts to the brain tactile sensations from the opposite side and also contains association fibers. 2. In the *lateral* column, are (*a*) Anterolateral tract of Gowers, which conducts to the brain sensations of touch, pain, and temperature from the opposite side of the body; (*b*) Anterior and lateral ground bundles, which connect different levels of the spinal cord with each other, and also connect the cord with the medulla and cerebellum (they contain both motor and sensory fibers); (*c*) Crossed or lateral pyramidal column, which is the chief motor tract from the brain; (*d*) Direct cerebellar tract, which conducts to the brain sensations from the viscera and also assists in the maintenance of equilibrium. 3. In the *anterior column*, are (*a*) Direct pyramidal tract, which is a

motor tract from the brain; (*b*) Anterolateral ground bundle, which connects different levels of the cord.

CHEMISTRY.

1. *Matter* is that which occupies space.
Three properties of matter: Indestructibility, divisibility, impenetrability.
2. A *molecule* is the smallest quantity of any substance (element or compound) which can exist in the free state.
An *atom* is the smallest quantity of an element which can enter into the composition of a molecule.
3. An *element* is a substance which cannot by any known means be split up into other dissimilar substances.
Five elements, with symbols: Carbon, C; Silver, Ag; Arsenic, As; Hydrogen, H; Potassium, K.
4. The *elements in the halogen group* are: Fluorine, chlorine, bromine and iodine.
To produce chlorine:

$$MnO_2 + 4HCl = MnCl_2 + 2H_2O + Cl_2.$$

5. OXYGEN. *Symbol*, O; *atomic weight*, 16; *valence*, 2.
To produce oxygen: $2KClO_3 = 2KCl + 3O_2$.
6. *Two alkali metals:* Sodium and potassium.
Sodium chloride, NaCl; potassium iodide, KI.
7. MERCURY. *Symbol*, Hg; *Properties:* A bright, metallic liquid, volatile at all temperatures, is not altered by the air at ordinary temperature, it alloys with most metals to form amalgams, it is insoluble in water but does not decompose water. *One method of obtaining mercury:* By distilling cinnabar in a current of air: $HgS + O_2 = SO_2 + Hg$.
8. *Carbon exists free* as: (1) Diamond; (2) graphite, and (3) coal.
9. *Three tests for albumin in the urine:* "The urine must be perfectly clear. If not so, it is to be filtered, and if this does not render it transparent, it is to be treated with a few drops of magnesia mixture and again filtered."
I.—*The heat test:* "The reaction is first observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present, a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3."
II.—*The trichloracetic acid test:* Add a crystal of

trichloracetic acid to the suspected urine; the acid dissolves, forming a layer underneath the urine. A white band at the junction shows the presence of albumin.

III.—*Heller's modification of the nitric acid test:* "Place in a test-tube a layer of HNO_3 about 2 c.c. in thickness; then, with a pipette, carefully float upon the surface of this a layer of the urine in such a manner that the liquids do not mix. If albumin be present, a cloudy ring appears *at* the point of juncture of the two layers, the borders of the cloud being sharply defined. A cloudy ring may be formed by the presence of an excess of urates, but in this case it is not *at*, but *above*, the point of junction of the layers, and its upper border is not sharply defined, but fades off gradually."—(Witthaus' *Essentials of Chemistry.*)

10. *Fehling's test for sugar in the urine:* Place in a test-tube a few c.c. of the liquid prepared as stated below, and boil; no reddish tinge should be observable, even after five minutes' repose. Add the liquid under examination gradually, and boil after each addition. In the presence of sugar a yellow or red precipitate is formed. In the presence of *traces* of glucose, only a small amount of precipitate is produced, which adheres to the glass, and is best seen when the blue liquid is poured out.

[The reagent must be kept in two solutions, which are to be mixed immediately before use. Solution I consists of 34.653 gms. of crystallized $CuSO_4$, dissolved in water to 500 c.c.; and Solution II of 130 gms. of Rochelle salt dissolved to 500 c.c. in NaHO solution of sp. gr. 1.12. When required for use equal volumes of the two solutions are mixed, and the mixture diluted with four volumes of water.]

GYNECOLOGY.

1. *Treatment of chronic endometritis.* The general health must be attended to; rest is indicated; constipation must be avoided; tonics are of slight use; ergot is useful for the menorrhagia or metrorrhagia; vaginal douches, pessaries, hip baths, and counter-irritation have all been recommended; curettage may help; and one or both lips of the cervix may be amputated. Foreign bodies, such as polypi and fibroids, must be removed; and any causative factors must be treated.

2. The *clothing* should be evenly distributed and not (as is now the fashion) leave nearly half the body uncovered; there should be no unnecessary constriction about the waist, and corsets should be made to suit the individual and not be selected merely because they

are the "style"; the clothes should not exert undue traction; garters are injurious; the shoes are too often high-heeled, stilt-like contrivances with a minimum of protection against cold combined with the greatest amount of compression; the extremities are too often left almost bare while the waist and hips are unduly covered and compressed. These errors in dress should be corrected.

3. *Operation for radical cure of umbilical hernia.* "(1) Incise at first through skin and fascia only; the incision is elliptical, with upper and lower ends in the median line, and widest part opposite the greatest width of the hernia. (2) Carefully deepen the wound on one side until the abdominal aponeurosis (sheath of the recti) is reached, aiming to come down upon it a short distance to the outer side of the hernial neck. (3) Having once reached the rectal aponeurosis, similarly expose this aponeurosis and the neck of the hernial sac all around the outline of the ellipse. All bleeding is controlled by clamp and ligature. (4) The hernial sac is now incised and its contents dealt with as indicated. Adhesions are separated. Excess of omentum is ligated and excised. All remaining contents of the sac are returned to the abdomen—and kept in place by a large, anchored gauze pad—which is removed just before closure of the abdomen. (5) The entire sac, with the umbilicus and the coverings included in the ellipse, is now excised—dividing the peritoneum in an elliptical manner about the neck of the sac. (6) The peritoneum—or the peritoneum and transversalis fascia together—is sutured with interrupted or continuous gut sutures. (7) The borders of the abdominal ring—formed by the sheaths and margins of the recti muscles—are freshened with curved scissors. The edges of the ring are then brought together with interrupted sutures of kangaroo tendon or chromic gut—using either the plain interrupted suture, or the mattress type. (8) The skin and fascia (unless the fascia be thick enough to require separate gut suturing) are sutured with interrupted silkworm-gut sutures. (9) The part is then well supported by an abdominal dressing." (Bickham's *Operative Surgery.*)

4. The *symptoms of carcinoma of the cervix* are pain, hemorrhage, and discharge; the cervix is hard and nodular and the mucous membrane seems immovably fixed to the underlying tissue. These nodules break down, and the entire cervix becomes ulcerated, or large cauliflower-like masses may fill the upper part of the vagina. The diseased tissue is friable and readily

bleeds when touched. A microscopical examination of a piece of excised diseased tissue may aid in the diagnosis.

5. PELVIC CELLULITIS. *Symptoms:* The onset of pelvic cellulitis is usually marked by a rigor, followed by pain in one or both flanks; febrile symptoms supervene, and, as the exudation increases, troubles during micturition or defecation are experienced. These signs are of greater significance when they follow within twenty-four or thirty-six hours an abortion, delivery, or an operation on the uterus. On examining through the vagina, a hard mass will be found on one or both sides of the cervix; in many cases the hard masses are conjoined by a ring of hard tissue surrounding the neck of the uterus. When the whole extent of the ligaments is infiltrated the swelling is perceptible at the brim of the pelvis and in the hypogastrium. When suppuration occurs, the temperature, pulse, and general condition of the patient are those accompanying large collections of pus. The local signs are as follows: the previously hard masses become softer, fluctuation is detected, or the overlying skin is edematous and perhaps red. The abscess is then said to point. *Treatment:* The patient is confined to bed, the bowels are kept regular by means of saline purgatives, and warm vaginal douches should be frequently administered by a careful nurse. Glycerin tampons help to relieve the pelvic congestion. When there is much abdominal pain, warm fomentations to the hypogastrium give great relief. When suppuration occurs and the pus can be localized, an incision should be made into it and the abscess drained." (Sutton and Giles's *Diseases of Women.*)

6. *Indications for dilatation of the cervix:* For diagnostic purposes in suspected cases of cancer or polypus of the body of the uterus; to remove retained products of conception; for dysmenorrhea; as a preliminary to curettage; for removal of a polypus; in cases of uterine hemorrhage to allow of other therapeutic or operative procedures; and in cases of cervical stenosis.

7. *Curettage is indicated:* (1) For removal of placental débris, (2) in hemorrhagic endometritis, (3) in some forms of dysmenorrhea (membranous), (4) for diagnostic purposes, (5) in some cases of puerperal sepsis, (6) sometimes to check hemorrhage, due to fibroids. *Contraindications:* (1) The least suspicion of even the possibility of pregnancy; (2) menstruation; (3) acute endometritis; (4) malignant disease

of the uterus or vagina; (5) acute pelvic inflammation.

Technique: All antiseptic and aseptic precautions are necessary, the patient should be in the dorsal position, the vagina is to be disinfected, and the cervical canal dilated; a speculum is introduced into the vagina and the cervix is drawn down with volsella; the uterine cavity is irrigated with creolin or lysol; a curette is inserted to the fundus and moved down to the internal os; the operator should begin at one cornu and go in the same direction all around till he reaches the starting point, and if necessary repeat till no more spongy or hyperplastic tissue appears; the fundus should be scraped separately by moving the curette along it from side to side; in going toward the fundus no scraping should be done, and care must be taken not to perforate the uterus; should this happen no fluid must be injected; otherwise the uterus and vagina are again irritated, and one or more strips of iodoform gauze are inserted into the cavity to act either as a hemostatic plug or as a drain, which is diminished with two days' interval and withdrawn on the sixth day. A hemostatic tampon should be placed in the vagina and withdrawn the following day. If any fever arises, the tampon is at once removed and the vagina douched with antiseptic fluid every three hours. If not, the vagina is only swabbed with the same every day, and packed loosely with iodoform gauze. After the final removal of the gauze the antiseptic douche is given twice a day until there is no more discharge. The patient should remain in bed for a week.

8. *Operations during pregnancy* "should be restricted to cases of immediate and urgent necessity. Plastic operations, as a rule, may be deferred. Tumors connected with the reproductive organs, such as carcinoma of the cervix uteri, ovarian cysts, uterine polypi, vaginal tumors, vulvar and rectal tumors, may have to be removed. The danger of abortion following operations during pregnancy is due chiefly to possible sepsis or to some other form of toxemia; even the toxemia of diffusible poisons and drugs, such as iodine, carbolic acid, bichloride of mercury, quinine, and the bromides, may induce abortion; hence the use of such drugs should be limited and judicious." (Dudley's *Gynecology.*)

9. The following symptoms may follow displacements of the uterus: Backache, bearing-down pains, a feeling of pressure in the pelvis, constipation, hemorrhoids, frequent or painful urination, leucorrhea, menstrual disturbances, as dysmenorrhea or menorrhagia, ster-

ility; there may also be *general symptoms*, as headache, indigestion, nausea, anorexia, neurasthenia, and general malaise.

10. *Operation for old laceration of the perineum.* "Lateral tears are best repaired by the Emmett operation. With the patient in the lithotomy position, guide sutures or tenacula are passed through the apex of the rectocele and through each labium majus at the lowest carunculæ myrtiformes. By drawing on the lateral suture and pulling the central suture downward and to the opposite side, the lateral sulcus appears as a triangle with the apex up in the vagina. This triangle is denuded of mucous membrane by cutting off long strips by means of forceps and scissors, or by dissecting the mucous membrane off in one piece. The triangle on the opposite side is treated in the same manner, and the denudation completed by removing the mucous membrane between the bases of the triangles and below the central suture. Each lateral triangle is closed by interrupted sutures of chromicized catgut or silkworm gut, the latter being shotted. The needle, which should be curved, is entered near the margin of the wound on the outer side, passed deeply to catch the fibers of the levator ani, and brought out at the bottom of the sulcus, at a point nearer the operator; it is then reinserted at the bottom of the sulcus, and passed upward and backward in the rectocele, to emerge opposite the point of the original insertion. The opposite triangle is treated in the same manner, which leaves a small raw area externally to be closed. The upper or "crown stitch" passes through the skin of the perineum below the lateral guide suture, then through the rectocele below the central guide suture, and finally through the tissues below the opposite guide stitch. As many sutures as may be necessary are inserted below this. If silkworm gut is used, the stitches should be removed on the tenth day. The external genitals are irrigated with weak bichloride of mercury solution after each urination; catheterization should, if possible, be avoided. The bowels are moved on the second day. Internal douches are not needed unless there be infection. The patient should be kept in bed two weeks, and heavy work and sexual intercourse forbidden for three months." (Stewart's *Surgery*.)

MATERIA MEDICA

1. *Carbo animalis* is made by subjecting bones to a red heat in close vessels. It is used to deprive substances of color.

Carbo ligni is made by burning soft wood without

free access of air. It is used as an absorbent and disinfectant; and is given internally in doses of from 10 to 20 or 30 grains.

2. *Sulphonal* occurs in colorless prismatic crystals, soluble in 15 parts of boiling water, and very soluble in boiling alcohol; very slightly soluble in cold water. It is used as a hypnotic in 15 or 20 grain doses. It was once believed to be harmless, but it is now known to be capable of producing headache, vertigo, noises in the ears, weakness, and incapacity for mental or physical exertion; edema, cyanosis, skin eruption, disturbances of digestion, ataxia, and abnormal conditions of the urine have resulted from its use.

3. *Potassium chlorate* occurs as colorless prisms or plates with a cool and salty taste, neutral reaction, and is soluble in 1 to 2 parts of boiling water.

Potassium carbonate is a white, granular, deliquescent powder, of caustic taste, and alkaline reaction, freely soluble in water, but insoluble in alcohol.

Potassium acetate occurs as a white powder or in crystalline masses, it is deliquescent, odorless, and has a salty taste; it is soluble in 0.4 part of water and in 2 parts of alcohol.

Vienna paste, potassa cum calce, is a mixture of equal parts of potassium hydroxide and lime.

4. *Four antiperiodics:* Cinchonea, and its alkaloids, arsenic, salicylic acid, and bebeeru bark.

5. *Physiological antagonism of drugs* means a balance of opposed actions on particular organs or tissues excited by drugs; *example:* the action of morphine and atropine; also the action of atropine and muscarine.

6. *Phosphorus* is obtained from bones; it occurs as a translucent, waxy solid, nearly colorless; insoluble in water, freely soluble in chloroform and in carbon disulphide; with a disagreeable odor and taste, and emitting luminous fumes in the dark.

7. *Official chlorides of mercury:* Hydrargyri chloridum corrosivum, and Hydrargyri chloridum mite; the *official iodides*, are: Hydrargyri iodidum rubrum, and Hydrargyri iodidum flavum.

8. *Protectives* are agents which are used to cover and protect a part from air, water, friction, etc. *Examples:* Collodion, gutta-percha, cotton, plasters of all kinds, and splints.

9. *Ethyl alcohol* is a thin, colorless, transparent liquid, with a sharp burning taste and a spirituous odor; it mixes readily with water, and attracts moisture from the air; it is a useful solvent. *Physiological action:* Alcohol, *externally*, acts as a refrigerant, an

astringent, a disinfectant, an anhidrotic; it also hardens the skin. *Internally,* it sharpens the appetite, is a digestant, a diuretic, a diaphoretic, is slightly antipyretic, it increases the force and rate of the heart beat and pulse, it is a vasodilator especially to the vessels of the skin, it causes an increase in the blood pressure, it is at first a slight nervous stimulant, but afterwards is a depressant; in large doses it is a narcotic, and then causes a reduction of body temperature.

10. Morphine salts will keep in solution if there is only a small quantity of the salt present. Thus the liquor morphinæ sulphatis of the U. S. P. of 1870, containing one grain to the ounce, used to keep well; but the Magendie's solution, containing 16 grains to the ounce, did not keep well, but decomposed. The alkaloid itself is less soluble than the salts.

THERAPEUTICS.

1. For *mucous diarrhea:* Regulate the diet, give milk or whey, then give castor oil or magnesium sulphate with bicarbonate of sodium and a little laudanum; a mustard plaster may be put on the abdomen; tonics and astringents as nitrate of silver, hyoscyamus, lead acetate and opium may be given.

For *serous diarrhea:* Give opium, volatile oils, camphor, spirit of chloroform, sulphuric acid; mercury with chalk or calomel may be of service; phenyl salicylate, thymol, or bismuth may be tried; the diet must be regulated, and tonics may be given.

For *diarrhea due to glandular deficiency:* Give pepsin, hydrochloric acid, podophyllin, nitrohydrochloric acid and ipecac.

2. *Therapeutics of argentum nitrate.* Nitrate of silver is used *externally* for: Conjunctivitis; granular lids; pruritus of genitals or anus; inflammations of the mouth, pharynx, fauces; orchitis and epididymitis; and to provent the pitting of smallpox; it is also said to abort bedsores and boils.

Internally, it is used: In chronic gastric catarrh, gastritis, and gastric ulcer; intestinal ulceration, epilepsy, and chorea.

3. *Iodine* has been used internally, and by injection, and also by inunction in exophthalmic goitre; it is not used much now. Other remedies are: Mental rest, hydrotherapy, fresh air, belladonna, electricity, organotherapy (thyroids and iodothyrin), serum of thyroidectomized animals, rodagen, anthithyroidin, and surgical measures (partial thyroidectomy, ligature of two or three of the thyroid arteries).

4. *Pilocarpine* was used hypodermically (in dose of gr. ⅛) in the early stage of erysipelas. Other remedies are: Tincture of chloride of iron, stimulants and tonics, ichthyol or bichloride of mercury as a dressing; nitrate of silver has also been applied; collodion, phenol, iodoform, bichloride of mercury and serums have been used.

5. Intravenous injections of quinine should be given very slowly, and a vein of the leg should be selected, because quinine in a concentrated form is a powerful depressant of the heart. Intramuscular injection should be given in the buttock.

6. *Remedies used in puerperal infection:* Tepid sponging to reduce body temperature; vaccines and antistreptococcus serum are of great value; vaginal douches, posture (Fowler's position), antiseptics applied locally, tonics, opium, given with caution, for the pain, and ichthyol applied locally, are the most frequently used remedies.

7. *To increase the milk fat,* the nursing mother should have a diet rich in nitrogenous substances or in fats; merely enlarging the diet may have the same effect. To *decrease milk fat,* reduce the diet both in quality and quantity.

8. PHENOL.—*Therapeutic action:* "As a disinfectant for surgical instruments, soiled linen, hospital apparatus, drains, privies, etc.; as an application for burns, carbuncle, endocervicitis, lupus, condylomata, and various other conditions; as an injection for leucorrhea and gonorrhea in the female; as a local anesthetic. Its antipruritic and parasiticidal qualities render it useful in many cutaneous affections; and it is employed locally in hay fever influenza, and nasal catarrh. In the treatment of wounds it has been largely superseded by more powerful germicides. Internally: gastrointestinal irritation; malarial fever, typhoid fever, scarlet fever, and other zymotic diseases; influenza; by hypodermic injection in tetanus and bubonic plague."—(Wilcox, *Materia Medica.*)

9. In *insolation,* cold water may be used to reduce the body temperature; cardiac stimulants are needed. For convulsions, inhalation of chloroform or hypodermic injections of morphine may be used. Venesection is used to relieve the asphyxia and distension of the right side of the heart.

10. If the chronic paludism is accompanied by an enlarged spleen, the unguentum hydrargyri biniodidi may be administered by inunction in the splenic area.

PATHOLOGY.

1. *Pathology* is the study of life in its abnormal relations; it is the science which treats of disease in all its aspects.

2. *Pleuroempyema* may result from: Lobar pneumonia, bronchopneumonia, pulmonary tuberculosis, abscess or gangrene of the lung. It may follow fracture of a rib, a penetrating wound, disease of the esophagus, abdomen, pericardium, and infectious diseases (particularly scarlet fever).

3. The prostate may show indications of atrophy, hypertrophy, concretions, inflammation, tuberculosis, and tumors. Hypertrophy is quite common in old men; the entire gland or one lobe may increase in size, obstruction of the urethre with retention of urine results. Inflammation is generally secondary to gonorrheal infection of the posterior urethra. Concretions occur late in life; they generally show concentric arrangement and are called *corpora amylacea*. Tuberculosis is generally secondary to tuberculosis of the vas deferens or epididymis. Tumors are not common.

4. *Toxemia* is the condition of blood-poisoning, or the presence in the blood of the poisonous products of any pathogenic microorganism. The *symptoms* are fever, chills, irregular pulse, increased respiration, diarrhea, unrest, dry tongue, delirium. The toxins may be destroyed by the secretions of the body (gastric juice, etc.), by the phagocytic action of the leucocytes, by the antitoxins which are produced.

Intoxication and infection: "In one class of diseases the infecting microbe remains localized at the point of inoculation, and is never or only exceptionally found in the fluids of the body, the general symptoms of the disease being due to the absorption of the toxic products. Such are true *intoxications*. In other cases the microbe is found circulating in the blood throughout the body, and finds lodgment in most of the organs. These are called *infections*."—(Stengel's *Pathology*.)

5. *Fracture of bone* may result in the formation of a blood clot which fills up the spaces between the ends of the bones. The blood clot becomes infiltrated with leucocytes and then becomes absorbed. The connective tissue cells in the surrounding parts proliferate, the bone undergoes osteitis of a rarefying type, so that the blood clot is replaced by granulation tissue. The granulation tissue becomes calcified and is then replaced by bone tissue. The periosteum is stripped up, becomes hyperemic and thickened, and callus is formed.

Contusion of the cranial bones may result in osteo-

myelitis or chronic sclerosis and overgrowth of the bone; syphilitic or tuberculous manifestations may be lighted up if the patient is the subject of either of these conditions; subcranial abscess may form; meningeal hemorrhage, with separation of the dura, may occur; inflammation and infection may spread from bone to membranes and from membranes to brain.

6. FOLLICULAR OVARIAN CYSTS.—*Causes:* They are due to the failure to rupture and the subsequent distention of a Graafian follicle. This condition may be brought about by the deep situation of the vesicle, by chronic ovaritis causing a thickening of the surface of the ovary or a hyperplasia of its stroma, and by an acute inflammation of the organ, producing deposits of lymph upon it. The disease may occur any time between puberty and the menopause. *Pathology:* These cysts vary in size from a hempseed to that of a small lemon, and in exceptional cases they may grow as large as a man's head. The ovary may be occupied by a great number of small cysts, or there may be one large cyst associated with several small ones, or the distended follicles may coalesce and form a single large cyst cavity. The contents of the cyst are composed of a clear, alkaline, serous fluid having a specific gravity of 1,005 to 1,020, and does not coagulate on exposure to the air or by heat. Sometimes the fluid may be a chocolate color from the presence of blood, or it may be purulent if the cyst becomes infected. An ovum is often found in small cysts, and in exceptional cases even in large sacs. The cyst wall, as a rule, is thin and transparent, but in some cases it is hypertrophied and densely opaque. The disease is usually bilateral."—(Ashton's *Gynecology.*)

7. *Adenoids* consist in a hyperplasia of the lymphoid tissue in the nasopharynx. They occur in masses which grow from the roof or posterior walls, or as pedunculated tumors which hang down into the posterior nares. They are soft and vascular, and bleed readily. They are found in infants and children, chiefly those with poor hygienic surroundings; they are often associated with enlarged tonsils; rickets and the status lymphaticus are believed to predispose to adenoids; damp and variable climates are most favorable to the development of adenoids.

8. *Causes of deafness:* Heredity, consanguinity of parents, injuries to the head during birth or in infancy, acute infectious diseases, diseases of the middle ear, inflammatory conditions within the cranium, obstructions of the Eustachian tube, diseases of the auditory nerve

or internal ear. There may be congenital absence of some part of the ear; deformities or atresia of the meatus may be present; intratympanic changes may prevent vibration of the labyrinthine fluid; the round or oval windows may be occluded; there may be a lesion in the auditory nerve, nuclei, fibers, or cortical areas or in the labyrinth.

9. The presence of *indican in the urine* is a measure of the putrefactive changes occurring in the intestine. It occurs in hypochlorhydria, also in hyperchlorhydria; in conditions in which there is diminished intestinal peristalsis, as in ileus and peritonitis; also when putrefactive changes are occurring elsewhere in the body, as in empyema, gangrene of the lungs, putrid bronchitis. *Skatol* occurs in the urine in much the same conditions as indican.

10. *Symptoms of acute anterior poliomyelitis:* Some fever, chills, and convulsions may precede the attack, or the onset may be sudden; certain groups of muscles (generally in the extremities) are paralyzed; hemiplegia is rare; the reflexes are generally lost; the paralysis is irregular in its distribution, and tends to ameliorate, but the recovery is only partial; the affected muscles waste, and the limb is cold and livid.

The primary changes are in the vessels of the anterior horn and in the gray matter; the changes in the cord are accompanied by round cell infiltration of the pia and arachnoid; the meningitis is most marked in the lumbar and sacral regions of the cord, next in the cervical; the inflammation is responsible for the irritative symptoms of the disease. The neuroglia becomes increased and the anterior horn is sclerosed and shrunken. The virus is found in the brain, cord, tonsils, nasopharynx, lymphatic and salivary glands, and elsewhere. The nasopharynx is probably the site of entry and of egress of the disease.

BACTERIOLOGY.

1. *Bacteriology* is that branch of science which is concerned with the study of unicellular vegetable organisms and with their relation to medicine, agriculture, and the arts.

2. Bacteria are recognized by their size, shape, groupings, staining reactions, and cultural characteristics; also by their ability to produce disease.

3. "Under constant and favorable conditions of life each kind of bacterium generally exhibits a true constancy of form. Long continued growth in artificial culture media, however, appears to have an injurious

effect upon certain varieties of bacteria. In old cultures or in cultures kept under relatively unsuitable conditions many bacteria pass into unusual forms which are plainly the result of degeneration and indicate that the cell has received some damage from untoward physical and chemical influences. These degenerative or involution forms often depart very widely from the typical form, and sometimes give to a pure culture the appearance of being contaminated by a foreign organism. Certain bacteria are especially prone to induce involution forms, and in at least one case, that of the plague bacillus, the occurrence of involution forms upon a particular culture medium (nutrient agar, containing 2.5 to 3.5 per cent. NaCl) has been thought to be characteristic and to serve as a valuable aid to the differential diagnosis of the organism."—(Jordan's *Bacteriology.*)

4. The *diplococcus intracellularis meningitidis* is a diplococcus similar to the gonococcus, but may appear as tetrads; the cocci vary in size, are nonmotile, and do not form spores; they stain readily with the usual anilin dyes, but not by Gram's method. The diplococcus grows upon meat infusions; upon agar, colonies appear in from eighteen to twenty-four hours; growth occurs best and most rapidly upon media to which ascitic fluid or blood serum has been added; Loeffler's blood serum is also a good medium. Its optimum temperature is about 37° C. It is extremely sensitive to heat and cold, and is killed by exposure to sunlight or to drying within twenty-four hours. Organisms that may be mistaken for it are the gonococcus (the history of the case should prevent this error), micrococcus catarrhalis (distinguished by fermentation tests and its growth at 23° C.), pneumococcus (which is Gram-positive). Besides the usual type, caused by the diplococcus, meningitis may be due to the pneumococcus, bacillus tuberculosis, various staphylococci and streptococci, typhoid bacillus, influenza bacillus, diphtheria bacillus, and gonococcus.

5. *Physiological leucocytosis* is an increase in the number of the white blood corpuscles occurring under normal or physiological conditions, such as: Digestion, exercise, after a cold bath, or during pregnancy.

6. To *stain the malarial plasmodium.*—A film is made in the usual way and is allowed to dry spontaneously; it is then fixed by immersion in a mixture of equal parts of absolute alcohol and ether. It is then stained with Loeffler's methylene blue. Or Jenner's blood stain may be used (without fixation); the film is placed in the stain for five minutes and is then washed in distilled water.

7. *Ptomaines* are substances which are produced by saprophytic bacteria from protein matter during putrefaction.

Toxins are the poisonous products of bacteria.

8. *Furunculosis* is generally produced by the *Staphylococcus pyogenes aureus*, which is a coccus occurring in clusters, nonmotile, nonflagellate, nonsporogenous, liquefying, pathogenic, ærobic, and optionally anærobic, which stains by the usual methods and also by Gram's stain. Its diameter is about 0.8 to 1 mikron.

Diphtheria is caused by the *Bacillus diphtheriæ*, which is a rod-shaped microorganism about 2 to 6 mikrons in length and from 0.2 to 1 mikron in breadth; the rods are slightly curved and often have clubbed or rounded ends; they occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella; are nonmotile and ærobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline methylene blue.

Syphilis is caused by the *Treponema pallidum*, which is a slender spirillum with regular turns, about 4 to 20 mikrons long, with a fine flagellum at each pole; it is actively motile, flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur.

Pneumonia is caused by the *Micrococcus lanceolatus* or *diplococcus* of Fraenkel, which is a spherical or oval coccus, often pointed at one end, usually in pairs, occasionally forming chains of three or four; sometimes a capsule is visible. It is nonmotile; stains readily with anilin dyes and also by Gram's method. It grows best at about 37° C., and is both ærobic and facultative anærobic.

9. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water, and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue. The tubercle

bacillus is rod-shaped, is from 1½ to 3½ mikrons in length and about one-third to one-half a mikron in breadth, is a strict parasite, is not motile, and has no flagella. It is slightly curved, does not form spores, is not liquefying, and nonchromogenic; is ærobic; it resists acids; it grows well on blood serum; stains well by Ehrlich's, Ziehl-Neelsen's, or Gabbett's method; it is Gram-positive.

10. The *Widal test for typhoid* is satisfactory, but not universally reliable. It is not obtained till the seventh day of the fever, and is rarely absent throughout the disease; it may persist for years after an attack; a negative reaction is of no value unless repeated two or three times.

The *Wassermann reaction for syphilis* is of value in the secondary stage; a negative reaction is of little or no value, particularly in the primary stage; positive results have been obtained in nonsyphilitic conditions.

The *von Pirquet test for tuberculosis* is not absolutely reliable, as it gives positive results in healed cases of adults as well as in those where the disease is active. It is said to be more reliable in children than in adults.

THEORY AND PRACTICE.

1. *Malaria* is an infectious disease caused by the hemocytozoon, transmitted by the bite of the anopheles mosquito, and characterized by paroxysms of intermittent fever of quotidian or tertian or quartan type, and remissions. The specific for malaria is quinine, which, properly given, destroys the parasite in the blood. It should be given promptly in doses up to 30 grains in twenty-four hours and continued in doses sufficient to keep up a moderate singing in the ears for a week after the parasites have disappeared from the blood. The dose may then be reduced, but should be continued for three months. It is best given in capsule or in acid solution. In pernicious cases it may be injected intramuscularly in 10-grain doses three times a day. Prophylactically quinine may be taken in doses of 5 to 10 grains every morning. Mosquito nets, wire screens, etc., must be employed; anopheles and their larvæ must be killed, and a system of drainage and covering pools must be inaugurated.

2. *Acute tonsillitis* has a sudden onset, with hot and dry throat, fever rapidly rising to 103° F. or higher, and severe headache; the breath is fetid, the tongue is foul, the glands below the jaw are swollen, there is pain on swallowing; there may be exudation or yellowish patches on the tonsils. Treatment consists in rest in

bed, purgation with calomel and a saline, reduction of the fever by salicylates or aconite; locally glycerin and belladonna or sucking tablets of potassium chlorate may be of great benefit. Antiseptic sprays are useful.

3. *Three complications of typhoid, with treatment:*—*Intestinal perforation* requires surgical treatment; laparotomy, with suture of the intestine should be done as soon as possible. In the meantime morphine may be administered. *Intestinal hemorrhage* requires opium, lead acetate, or calcium lactate every three or four hours, a hypodermic injection of morphine or ergotin, and the application of an icebag over the cecum. *Constipation*, if severe, demands enemata; don't give purgatives after the first week.

4. CHRONIC INTERSTITIAL NEPHRITIS. *Symptoms:*—Insidious onset, frequency of urination, especially at night; languor, headache, and thirst, the urine is pale and clear, and is increased in quantity; blood or albumin may be detected in it, but albuminuria may be absent for a long time. Later on, cardiac symptoms appear, such as pallor, dyspnea, asthma, dimness of vision, dropsy, and hypertrophy of the heart. *Complications* are arteriosclerosis, cardiac failure, dropsy, and threatened uremia. *Treatment* should be directed to causative factors, and diet and hygiene should receive attention. The food should be largely of milk, fruit and vegetables. Meat should not be allowed more than once a day. Nitroglycerin or aconite may relieve the high arterial tension; the bowels must be kept free; as a rule, alcohol should be prohibited. The patient should be protected against cold, and tepid baths and friction are of benefit.

5. *Tonsillitis* has a sudden onset, with chill and high fever (103° to 105° F.); the tonsils are considerably enlarged; the pseudomembrane is not adherent, is easily removed, is limited to the tonsil, does not bleed when removed, and does not reform; bacteriological examination shows staphylococci and streptococci, but not the Klebs-Loeffler bacilli.

Diphtheria has a more gradual onset, chill is generally not present, and the fever rarely reaches 103° F.; the tonsils are not much enlarged; there is a thick membrane, which is adherent, is removed with difficulty and with bleeding, tends to reform, and is not limited to the tonsil; bacteriological examination shows the Klebs-Loeffler bacilli.

6. *Tetany* is probably due to a toxin acting on the peripheral motor neurones. It occurs chiefly in the young, and is often associated with some general dis-

order, such as rickets, diarrhea, pregnancy, gastric dilatation, extirpation of the thyroid, or some specific fever (such as typhoid). *Treatment* consists in attending to any real or apparent cause; hot and cold baths and potassium bromide are of benefit for the spasm, so, too, is inhalation of chloroform: massage, galvanism, icebag to the spinal column, and chloral are said to be useful.

7. In *tuberculosis with consolidation*, the lung shows dullness on percussion, bronchial breathing is heard, the breath sounds are intensified, and the tubercle bacilli may be detected in the sputum. In *pleurisy with effusion*, the lung gives flatness on percussion, there is no bronchial breathing over the fluid, the breath sounds are diminished or absent, and the tubercle bacilli are not found in the sputum.

8. In *ileocolitis*, the patient should be placed in bed, and the diet restricted to milk, limewater, or mutton and chicken broths, to which well-boiled rice has been added. A mild laxative, as calomel, magnesia or Epsom salt should be given to relieve the bowel of the irritant; opium is of help; salol and bismuth salicylate have proved of service. Locally, warm fomentations and poultices, or camphorated oil, are beneficial and agreeable.

9. *Acidosis* means an increased elimination of acids by the urine, and is a precursor of acid-intoxication. It may occur in diabetes, starvation, and poisoning by phosphorus, salicylates or chloroform.

10. *Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing and tinnitus. The inflammation causes closure of the eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided. A moderate spray of Dobell's solution may be used. If pain is present, dry heat, in the form of hot-water bottle, hot stone wrapped in flannel, etc., may be applied. A few drops, warmed, of a carbolic acid solution (1:40), or one of formalin (1:2000), may be instilled into the ear.

Acute purulent otitis media: Acute catarrhal otitis media, instead of undergoing resolution, may pass into acute purulent otitis media (especially in exanthemata) from the passage of pathogenic germs from the nasopharynx into the middle ear. The pain will become more intense, the hearing dull, tinnitus will become louder and more distressing, and fever usually sets in.

Dry heat allays the pain. Warmed water or warmed carbolic acid solution (1:40) may be used. Inflations, aspirations, etc., should be avoided. If the nares are filled with tough secretions, a spray of Dobell's solution may be used. If the pain continues over six hours in a child or over twelve hours in an adult without spontaneous perforation of the tympanic membrane, paracentesis of that structure should be performed. The concha and meatus should be smeared with petrolatum to avoid chapping, and the secretions should be gently mopped off as they appear. Under this treatment the ear usually returns to normal in two to three weeks.

Chronic purulent otitis media is due to the permanent lodgment of staphylococci in the acutely inflamed middle ear. This unfortunate result is usually brought about by improper—*i.e.* excessive—treatment of acute otitis media, generally by the patient, but sometimes, regrettably, by the physician.

Chronic catarrhal otitis media results from acute catarrhal otitis media that has failed to undergo resolution. Nasopharyngeal catarrh is usually associated with this condition. The onset is gradual and is characterized by repeated attacks of the acute form, each one increasing in severity. As the symptoms of tinnitus and deafness increase there may be attacks of ear vertigo of tympanic origin. These may be mistaken for neurasthenia, epilepsy, apoplexy, etc. Early in the case there are contraction of the tensor tympani, retraction of the chain of auditory ossicles, and consequent impaction of the stapes in the oval window. *Complications* are inflammation of the mastoid cells, caries and necrosis, phlebitis, meningitis, and brain abscess.—(*Pocket Cyclopedia.*)

OBSTETRICS.

1. *Fecundation* is the result of the meeting of a live and healthy spermatozoon, with a live and healthy ovum, in a suitable medium (generally the Fallopian tube). During coitus the seminal fluid is ejected into the upper part of the vagina and against the cervix of the uterus; the spermatozoa enter the uterine cavity (either by the suction of the uterus or by their own vibratile motion) and so pass on to the Fallopian tube. Several spermatozoa may surround an ovum, or even pierce the perivitelline space; but only one spermatozoon enters the vitellus. This spermatozoon loses its tail; and its head becomes the male pronucleus. The male pronucleus and the female pronucleus now fuse together, and fecundation is completed.

2. Up to the fourth month there are no certain signs of pregnancy, but the following are presumptive:—Cessation of menstruation, nausea and morning vomiting; increased size and fullness of the breasts, with darkened areola and enlarged Montgomery's follicles, colostrum may be present; the abdomen and umbilicus may appear flatter than usual, there may be pigmentation; the uterus may be felt to be enlarged; the cervix is softened, and the cervix and vagina are of a purplish hue; Hegar's sign of softening of the lower uterine segment may be elicited.

3. *Diameters of the fetal head:*—The occipitomental is approximately 5½ inches; the occipitofrontal, about 4½ inches; the biparietal, bimastoid, suboccipitobregmatic, and frontomental, about 3½ inches.

4. At full term the *placenta* is a soft, spongy mass, roughly saucer-shaped, from six to nine inches in diameter, about three-quarters of an inch in thickness at the central point, and weighs about one pound. It is *formed*, partly from the mucous membrane of the uterus, and partly from the chorionic villi. Its *functions* are: (1) To supply nourishment to the fetus; (2) to act as a respiratory organ for the fetus; (3) to act as an excretory organ for the fetus; (4) it is also supposed to provide an internal secretion. Its *usual location* is on the anterior or posterior wall of the uterus, near the fundus.

5. In addition to the bath, clean clothes, and other details which may be taken for granted in persons of refinement, the physician should, before making a vaginal examination, carefully cleanse his hands, as scrupulously as if he were about to undertake a major operation. The hands should be scrubbed for at least five minutes with hot water, soap, lysol, and a nail brush that has been boiled or soaked for some time in an antiseptic. Special care must be given to the nails and nail-folds. The hands should then be soaked for three minutes in an antiseptic solution such as bichloride of mercury 1:1000. This is followed by another washing in sterile water. Rubber gloves that have been boiled and kept sterile and a sterile gown add to the safety of the patient.

The patient should receive a full bath before labor begins and all bed clothing and personal clothing should be clean. If there are any pathological discharges from the genitals, the vagina should be thoroughly scrubbed with tincture of green soap and hot water, followed by a mercuric chloride douche (1:2000); this is followed by a douche of sterile water. The physician's hands should

be scrubbed for ten minutes with tincture of green soap and hot water, followed by alcohol, and immersion in mercuric chloride (1:100). All instruments should be boiled for ten minutes or immersed in mercuric chloride 1:1000 for half an hour. Examinations should be made when necessary to determine the position, presentation, size of the fetus, etc.

6. *Symptoms of death of the fetus* during the later months of pregnancy are:—Cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements cease, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete milk. If the fetus has been dead for some time crepitus of its cranial bones may be elicited.

7. *Abortion* is the expulsion of the ovum during the first three months of pregnancy. *Miscarriage* is the expulsion of the fetus prior to the seventh month. *Premature labor* is the birth of a viable fetus before the termination of pregnancy.

8. *A diagnosis of occipito-posterior position may be based* on:—Finding the sagittal suture in the oblique diameter of the pelvis, the posterior fontanelle in the posterior half of the pelvis, the anterior fontanelle is easily accessible; the fetal heart sounds are heard far back in the flank, between the ribs and the crest of the ilium; the fetal head may be felt above the pelvic brim, and the fetal small parts are felt through the anterior abdominal walls of the mother, while the fetal back is not felt.

The normal course of delivery in occipito-posterior positions, is the same as in occipito-anterior positions, except that the head must rotate to the front through three-eighths of a circle; of course, this takes longer and is more tedious.

In abnormal cases, the management is as follows:

"(*a*) *When diagnosed while the head is at the brim.* (1) Leave it alone. The occiput will probably rotate to the front all right if it is given plenty of time. (2) If flexion appears to be deficient, try to increase it by pushing up the sinciput with the fingers in the vagina during a pain, at the same time pressing down upon the fundus with the other hand. (3) The head may be rotated by passing the hand into the vagina and grasping it between the fingers and thumb. At the same time the shoulders must be rotated by abdominal palpation, or else the head will at once go back to its original position. This maneuver generally requires an anesthetic.

"(*b*) *When diagnosed after the head has entered the pelvis.* (1) Leave it alone. After exercising the patience of all concerned, it will probably rotate spontaneously. Only about one case out of twenty fails to do so. (2) An attempt may be made to increase flexion as before. (3) Manual rotation may be attempted as before, but the head must first be flexed and gently pushed back out of the pelvis. (4) If the pains are weak, forceps should be applied well back on the head, so that when traction is applied, flexion will be promoted. The head should then be pulled well down on to the pelvic floor. If it begins to rotate, take off the forceps and leave the rotation to nature, merely keeping the head on the pelvic floor by pressure on the fundus. After rotation the forceps may, if necessary, be reapplied and delivery completed.

"(*c*) When the occiput has definitely rotated into the hollow of the sacrum, and the case has become a persistent occipitoposterior, forceps should be applied and the head delivered with the occiput posterior. The perineum should be guarded as much as possible, and any tears stitched up at once. In extreme cases craniotomy and pubiotomy may require to be considered." —(Johnstone's *Textbook of Midwifery.*)

9. *If the hand prolapses* in a head presentation, and the condition is diagnosed before rupture of the membranes, nothing should be done until the cervix is completely dilated. Then the hand may be pushed up to allow the head alone to engage in the brim. If this fail, forceps may be applied to the head if there be no risk of catching the arm, or version may be carried out. In extracting with forceps the arm may slip up. When the case is made out only after the arm is well engaged in the brim, the head should be delivered with forceps. In breech presentations the hand sometimes presents; nothing need be done the hand may or may not slip up.—(Jewett's *Practice of Obstetrics.*)

10. ACUTE MASTITIS. "*Symptoms.* The breast is swollen, painful, and tender, and, owing to the soreness of the nipple, the breast is not relieved of its secretion, so that it is distended. If suppuration follows, redness, edema, and fluctuation occur over the site of the abscess. The abscess may be—(1) supramammary, the pus lying between the skin and breast; (2) intramammary, or the common form, in which the pus is in the substance of the breast; (3) submammary, which is beneath the breast, and may spread from the deep lobules, but more frequently is

due to disease of the underlying ribs. *Treatment* before suppuration occurs consists in supporting the breast with a bandage, emptying the gland regularly with a breast pump, and applying a belladonna plaster over the gland to stop the secretion and allay the pain. When pus is present an incision should be made at once, or the abscess may burrow extensively and riddle the breast. The incision should be made in a line radiating from the nipple, so as not to cut the ducts; it should be free, and all pockets opened up with the finger. Then a large drainage tube is inserted and shortened daily, as the wound heals by granulation. If necessary, several incisions are made."

CHRONIC MASTITIS. "*Symptoms:*—There may or may not be pain in the breast, but a number of small scattered lumps are usually found. Both breasts are usually affected. The skin is seldom attached over the lumps, but the lymphatic glands may be slightly enlarged. Distinct cysts may be felt in some cases. The disease slowly progresses and ends in atrophy of the breast or general cystic formation. It is said that cancer is likely to follow interstitial mastitis. *Treatment* consists in supporting the breast and applying a belladonna plaster. Single cysts should be removed, but if the whole gland is cystic complete removal is better."—(*Aids to Surgery.*)

SURGERY.

1. The *symptoms of Pott's disease of the spine* are pain, tenderness on pressure, rigidity of the back, and a sense of weakness, which may usually be recognized by the child's actions. When suppuration occurs, the pus may enter the sheath of the psoas, destroying the muscle, and presenting in the iliac fossa or groin as an iliac or psoas abscess or it may pass backward through or external to the quadratus lumborum, and point in the loin, when it is known as lumbar abscess. In the cervical region retropharyngeal abscess may occur. Spinal paralysis may come on at any time and myelitis develops in the later stages. *Treatment:*—"Rest in bed, using sand bags as splints, is the first consideration. After the acute symptoms have subsided a Thomas splint, Sayre's plaster cast, or Cocking's felt jacket may be applied to the back and the patient gradually allowed to move about. *To apply the plaster-of-Paris case*, the patient should be suspended so that the heels are just off the ground. A skin-fitting vest is then applied to the trunk, under which a stomach pad is inserted, which should be removed after the plaster

has become dry. Plaster bandages should now be applied in the usual manner, extending from the level of the axilla to just below the crest of the ilium. When the case is dry, it may be divided down the front and perforated, so that it can be laced up or removed at any time. Abscesses should be opened early and freely, and injections of iodoform emulsion will be found very beneficial. Laminectomy is sometimes advisable."—(*Pocket Cyclopedia.*)

2. *Intussusception* occurs most frequently in childhood, is accompanied with tenesmus and frequent diarrhea with passage of bloody mucus, the body temperature is normal or subnormal, the pulse is weak, the trouble is in the small intestine, and the bowel frequently protrudes at the rectum.

Appendicitis generally occurs in early adult life, there is no tenesmus, the stools are infrequent, there is moderate fever, 102° to 103° F., the pulse is of good volume, pain is located in the right iliac fossa, and there is dullness on percussion in this region.

Treatment of intussusception:—"The reduction of the intussusception at the earliest possible moment is the only treatment admissible, and this can only be done with certainty by operation. The abdomen should be opened over the tumor if it can be felt; if not, in the mid-line below the umbilicus. The intussusception is then reduced by squeezing out the entering portion, beginning at the lowest part. The intestine should never be pulled out, for fear of tearing it. If there is any difficulty, the wound must be enlarged and the lump brought out. If, owing to adhesions, reduction cannot be done, the intussuscepted portion must be excised through an incision in the ensheathing layer, but the outlook is bad in these cases. If the bowel is gangrenous, the condition is so bad that nothing more can be done than to bring out the coil and establish an artificial anus. If, owing to any reason, an operation is not possible, non-operative procedures must be tried. These consist of attempting to reduce the invagination by inflation with air, or, better still, by fluid. A catheter is passed into the rectum, and fluid poured in from a funnel raised not more than two feet. A hand is placed over the tumor to feel when the lump disappears. The objections to this are, that after twelve hours reduction cannot be obtained by this method; that valuable time is wasted if it fails; that you cannot tell if the last inch has been reduced (and if it has not, recurrence is certain); that it is no use in the enteric or ileo-colic forms; and that the bowels may be ruptured."—(*Aids to Surgery.*)

3. *Acute ischio-rectal abscess* is due to infection of the fat of the ischio-rectal fossa with pyogenic organisms. It occasionally results from skin infection, but usually spreads from the rectum. The mucous membrane is abraded by a constipated motion, and the *Bacillus coli* then invades the wall and spreads to the fossa. A fish bone or pin occasionally causes the wound in the rectum. An abscess forms alongside the rectum, and may burst into the rectum, on the surface, or both, a fistula being likely to follow. *Treatment*:—A free incision should be made at once, opening up every part of the abscess, including the communication with the bowel if it can be found. Cellulitis of a gangrenous type may also occur, and must be promptly treated by free incisions and stimulants.

Chronic ischio-rectal abscess is met with in phthisical patients. A caseating focus is found in the fossa, which breaks down and discharges by several sinuses, which may be at a distance from the anus. *Treatment* consists of a free incision, scraping out the tuberculous area, and applying pure carbolic acid.

4. "*Splenectomy* has been performed for:—Injuries; spontaneous rupture in typhoidal and other splenic enlargements; splenoptosis; abscess; tumors, which are rare, the most frequent being sarcoma; cysts, hemorrhagic, serous, lymph, or most frequently hydatid; malarial hypertrophy; idiopathic splenomegaly; splenic anemia, in which there is enlargement of the spleen, with diminution in the number of white and red blood cells, and a reduction in the percentage of hemoglobin; Banti's disease (hypertrophy, with cirrhosis of the liver); and certain other affections, such as tuberculosis, syphilis, and amyloid disease. The operation is contraindicated in leukemia and in the presence of marked cachexia and dense universal adhesions. An incision is made in the left semilunar line, the phrenosplenic ligament tied and divided, the spleen delivered through the wound, and each vessel of the pedicle severed between ligatures."—(Stewart's *Surgery*.)

5. *Pathogenic microorganisms which cause wound infections*:—Staphylococcus pyogenes aureus, albus, and citreus; streptococcus pyogenes; gonococcus; pneumococcus; bacillus coli communis; tubercle bacillus; actinomyces; and anthrax bacillus.

Treatment of infected wound of soft parts. The wound is covered with gauze while the skin around it is cleaned up to the edge; the wound is held open and enlarged if necessary; it is flushed with sterile water

and with an antiseptic lotion; bleeding is checked; foreign matter is removed; loosely attached or crushed tissues are snipped off; pockets where dirt, blood, or bacteria might lodge are opened; the wound is then packed with antiseptic gauze and left open (or closed with temporary sutures). The packing is removed in three days, when stitches may be tightened; where there is a thick discharge, moist dressings should be applied, but they must be frequently changed; drainage is necessary.

6. *Delayed union in fracture is caused by:*—Ill health, want of approximation of the end of the bone, want of blood supply in the bone, defective innervation of the bone, disease of the bone, lack of rest, and immobility.

Delayed union is detected by finding movement of the fragments after the recognized period for such union (in case of humerus or tibia this is six or seven weeks).

Treatment is given by DaCosta as follows:—"When delayed union exists, seek for a cause and remove it, treating constitutionally if required, and thoroughly immobilizing the parts by plaster. Orthopedic splints may be of value. Use of the limb while splinted, percussion over the fracture, and rubbing the fragments together, thus in each case producing irritation, have all been recommended. Blistering the skin with iodine or firing it has been employed. If the case be very long delayed, forcibly separate the fragments and put up in plaster as a fresh break. If these means fail, irritate by subcutaneous drilling or scraping, or, better, by laying open the parts and then drilling and scraping at many places."

7. *Penetrating wounds of joints:*—If the wound is aseptic, only a small amount of inflammation follows; if septic, acute arthritis develops. If glairy synovial fluid is seen escaping from the wound, it is certain that the joint is opened; if it is doubtful as to whether or not a wound leads into the joint, the skin should be purified, the opening enlarged, and a careful examination made to settle the point. If the joint is opened, the aperture should be enlarged, the joint washed out, and drained with a rubber tube, which can be removed in a day or two if no septic inflammation supervenes.

8. *"The decompression operation* (decompressive trephining):—This operation is employed particularly in cases of inoperable brain tumor. It differs from palliative trephining in the fact that the dura is incised and an opening left to permit of bulging of the

brain. The bulging relieves pressure. By Cushing's method we get a hernia of the brain, but not a fungus cerebri. Cushing and Bordley have performed it in cases of uremia, and improvement has followed. They suggest that the operation be used in certain cases of renal disease when medical treatment and lumbar puncture have failed to abate uremic symptoms, or when blindness is impending. The effect of the operation in cases of brain tumor is sometimes extraordinary. Its most prominent benefit is in abolishing choked disk. It must not be done directly over a tumor, because the bulging tumor might become the seat of hemorrhage. It is, of course, useless in relieving blindness, for blindness means atrophy, but it is often very valuable in preventing blindness. When choked disk exists, operation should be done early, even if there is good vision. If in advanced cases any sight remains, it should be performed. Now and then there is an unfavorable result, which was good previous to operation. The permanence of the relief to the choked disk is variable. It is not always permanent. Cushing's subtemporal decompression is done upon the right side as a rule, but in some cases on the left side. An objection to doing it on the left side is that the bulging of the left temporal lobe may cause word deafness. A curved incision is made through the skin and subcutaneous tissue, the flap is turned down, the temporal fascia is incised in the direction of the muscle fibers beneath it, the temporal muscle is split and not cut, the periosteum is separated from the bone, the soft parts are retracted, the bone is opened as the surgeon prefers, and the opening is enlarged with a rongeur. The dura is opened, and radiating incisions are made through it toward the edges of the bone gap. The wound is closed by four layers of fine silk sutures." —(DaCosta's *Surgery*.)

9. *Chronic osteomyelitis* "follows an acute attack, or begins of itself. In the former case, after pus obtains exit, a slow, rarefying, and at the same time osteoplastic, inflammation continues for months. The sinuses discharge thin pus, and at times particles of necrosed bone; but they may at intervals become blocked by exuberant granulations, or dried pus, when a sharp pain ensues in the bone, accompanied by feverish symptoms. Any injury may set free bacteria from the granulations, and cause local cellulitis. Meanwhile the bone becomes irregularly thickened, either at one spot, or all over. The other form often begins with a short acute stage, which may be altogether overlooked. It may not show itself for years, and then

commences with aching in the bone. There is usually unnatural thickness of the bone, and this becomes more marked in one place, and an abscess may be formed in the soft tissues. It takes three forms—(1) central necrosis; (2) localized abscess; (3) sclerosing osteomyelitis, without suppuration.

Treatment consists in removal of sequestra (*sequestrotomy*) and suppurative centers. The limb is made bloodless; an incision is carried down to the bone, and the periosteum stripped back; a wide layer of new-formed bone is chiselled off, and the cavity laid bare. The sequestrum is removed, and the cavity scooped out with a sharp spoon. Healing takes place slowly by granulations under simple tamponade; and in order to hasten it, the wound may be closed with a flap of skin loosened from the sides while the cavity may be filled up with blood clot, or with iodoform paste (iodoform, 60, sesame oil, 40, spermaceti, 40), which are ultimately absorbed, and replaced by new-formed bone. For the same purpose, the periosteum may be left in contact with the cortical layer, which is chiselled off as an osteoplastic flap, and is replaced in position, after the cavity is cleared out; or a piece of living, or decalcified, bone may be engrafted."—(Buchanan's *Surgery*.)

Amyloid kidney may occur in cases of long-continued suppuration of bone. The treatment lies in the early treatment of the primary condition, and, besides the recognized surgical measures, includes fresh air, sunshine, nourishing food, tonics; iron, arsenic, potassium iodide and bismuth are often of service.

10. *Ligation of common carotid artery in superior carotid triangle:*—Make an incision three inches long in the line of the artery (from the sternoclavicular articulation to a point midway between the angle of the jaw and the mastoid process), so that the center of the incision is on a level with or very little higher than the cricoid cartilage. This incision goes through the skin, superficial fascia and platysma. The deep fascia is then cut through, and the edge of the sternomastoid is exposed, and then drawn outward. The omohyoid is then exposed by cutting through a dense fascia. Here there is usually a plexus of veins in front of the artery. Draw aside the lateral lobe of the thyroid body, and look for the deep guide to the vessel, namely the angle formed by the anterior belly of the omohyoid with the anterior border of the sternomastoid (the artery bisecting this angle). Draw the omohyoid downward, and then expose the sheath so that the descendens

hypoglossi nerve and the sternomastoid branches of the superior thyroid artery are not injured. The sheath is opened on its tracheal side; then clear the artery and pass the needle from the outer side to avoid the risk of wounding the internal jugular vein and vagus nerve.

Complications which may arise from ligation:—Twitchings, tremblings, convulsions, syncope, giddiness, loss of sight, hemiplegia all probably due to diminished supply of arterial blood. Softening of the brain, stupor, and apoplexy may occur from venous congestion; the lungs may become congested; death may occur from cerebral disease due to sudden interference with the cerebral circulation.

HYGIENE.

1. *Excessive weeds and shade about a dwelling* keep out sunshine and fresh air, favor dampness and the multiplication of molds and bacteria, and aid in harboring insects, mosquitoes, etc. Vegetation prevents the sun's rays from reaching the ground, so excess of weeds makes the climate lass equable and the soil more damp, and at the same time restricts the movements of the air.

2. *Pure water* is colorless, odorless, cool, without disagreeable or salt or sweetish taste, and is free from bacteria, poisons, foreign bodies, etc.

Characteristics of a good drinking water:—(1) It should be clear and limpid. Cloudy and muddy waters should be avoided. (2) It should be colorless. A greenish or yellowish color is usually due to vegetable or animal matter in solution or to organisms. (3) It should be odorless; especially free from sulphuretted hydrogen or putrefactive animal matter. (4) It should not be too cold, but should have a temperature of from 46°F. to 60° F. (5) It should have an agreeable taste; neither flat, salty, nor sweetish. A certain amount of hardness and dissolved gases give a sparkling taste. It should contain from 25 to 50 c.c. of gases per liter, of which 8 to 10 per cent. is carbon dioxide and the rest oxygen and nitrogen. (6) It should be as free as possible from dissolved organic matter, especially of animal origin. (7) It should not contain too great an amount of hardness. A certain quantity of saline matter is necessary, however, to give it a good taste. It should not contain over three or four parts of chlorine in 100,000 parts of water.—(From Bartley's *Chemistry.*)

Contaminated water is purified by:—Distillation,

boiling, filtration, precipitation, and various chemical processes.

In *collecting and storing rain water for drinking:* The first flow should be allowed to run to waste; this is to ensure cleanliness. The cisterns for storage should allow of easy inspection and cleansing; they should be kept covered so as to exclude dirt, dust, insects, animals, and light overflow pipes should discharge into the open air and not into the sewer, and the opening should be covered to keep out small animals and foreign matter; the cisterns should be well ventilated, and regularly and thoroughly inspected.

3. The water must be the purest obtainable, and fixtures must be as simple as is compatible with efficiency. There must be no public or stationary drinking cups; paper cups are the best. There must be no means of drinking direct from the faucet. There must be no means of interfering with the water supply or with the proper care of fixtures, etc. There must be proper and constant inspection to see that there is no undue waste of water, and that everything is as clean as possible.

4. *Five preventable diseases:*—(1) Smallpox, which can be prevented by compulsory vaccination and prompt isolation of all cases; (2) malaria, which can be prevented by the destruction of anopheles mosquitoes and their breeding places; (3) bubonic plague, which can be prevented by the complete destruction of rats; (4) Malta fever, which can be prevented by avoiding the milk or meat of goats imported from the Mediterranean countries or from the endemic center in Texas; (5) hydrophobia, which can be prevented by the long-continued and systematic muzzling of all dogs.

5. (*a*) The negro is comparatively insusceptible to yellow fever and dysentery. (*b*) The negro is more suceptible than the whites to tuberculosis, venereal diseases and keloids. The reason for (*a*) is probably an acquired immunity. The reason for (*b*) is probably lessened resistance and lowered vitality combined with inferior hygienic surroundings.

6. In the cold weather there are greater and more frequent changes of temperature, and ventilation is poorer; hence the vitality of the body is lowered, and there is a greater liability to take disease.

7. *During an epidemic of poliomyelitis,* "the patient must be isolated except for the necessary attendance; he must also be screened from flies. All utensils coming in contact with the patient's mouth must be immediately disinfected. All nasal or buccal secretions

must be immediately destroyed by burning or by efficient chemical germicides. The physical condition of other members of the family must be carefully looked after. The case must be reported at once to the authorities, who will see that the latest information is placed in the hands of the physician. Both the profession and public must be educated to a knowledge of the dangerous infectiousness of the disease."—(Gardner and Simonds' *Practical Sanitation.*)

8. In *pellagra*:—Spoiled corn should be avoided, and the corn should be replaced by other grains; salt should be given with the food; rest is necessary; diet must be nutritious and properly balanced; eggs and milk are valuable, but a milk diet is not recommended; hydrotherapy, massage, and fresh air are valuable; if possible, a trip to a cool climate should be advised. Ice applications have proved beneficial.

9. *Ptomaines* are derived from protein matter (by the action of bacteria). Disorders produced by them are intestinal intoxication; food poisoning (canned meats, sausages, decomposing fish, cheese, ice-cream, and milk); gangrene.

10. Diet presents a serious problem. Prolonged heat exerts an unfavorable influence on digestion, hence too much of a burden should not be placed on the digestive system. No more food should be taken than can be comfortably digested. Vegetables and fruit are preferable to meat; the latter should be taken only once a day; fish, if fresh, is good; the same applies to milk. Fruit should be quite ripe, and sound. Cold tea or lime-juice makes a refreshing beverage. Pure water is the best thing to drink. Alcohol should be let alone, or taken only if there is a distinct indication for it, and then only with food.

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF CALIFORNIA.

ANATOMY AND HISTOLOGY.

1. (*a*) What structures are derived from the epiblast; hypoblast; mesoblast? (*b*) Simple tissues of the human body may be divided into five classes. Name and define each class.

2. Briefly describe the heart; location; relation to chest wall and vertebræ; composition and arrangement of walls; nerve and blood supply; valves and endocardium.

3. Describe the mandible (inferior maxillary bone).
4. Give the histology of lung tissue.
5. Briefly describe the ovary. Give its relations; blood and nerve supply. Define ovulation; graafian follicle; corpus luteum.
6. If the abdominal aorta be ligatured two inches superior to its bifurcation, how may a collateral circulation be re-established below the ligature?
7. Describe the hip joint, naming muscles passing across the joint.
8. Differentiate bursa mucosa and bursa synovial. Locate five important examples of each kind.
9. Name and locate the ganglia that communicate with the branches of the fifth cranial nerve; give the anastamoses of the branches of the first and second divisions of the fifth cranial nerve.
10. Give the insertion and nerve supply of the following muscles; soleus; tibialis postius; pronator radii teres; scalenus anticus; quadratus femoris; biceps femoris; sartorius; obturator internus; platysma; temporal.
11. Give the origin and nerve supply of the following muscles; trapezius; gastronemius; latissimus dorsi; biceps cubiti; sterno mastoid; omo-hyoid; pectoratis minor; brachio-radialis; rectus femoris; internal oblique.
12. Give the action of any ten muscles of the foregoing groups.

Answer ten questions.

PHYSIOLOGY.

1. Describe how the distribution of blood is regulated on change of position.
2. Explain the influence of the vagus nerve on respiration.
3. In what does the peristalsis of the esophagus differ from other parts of the alimentary canal?
4. How do the movements of the large intestine differ from those of the small intestine?
5. Discuss causes, mechanical and nervous, in the call to defecation.
6. Why is it that living tissue resists many influences which attack dead tissue with disastrous effect?
7. Discuss the maintenance of the rhythmical beat of the heart.
8. Describe by diagram and text the growth and development of a nerve cell.
9. What effect will transfusion of a moderate amount of fluid have upon the blood pressure? Explain why.

10. Why do we not have coagulation of blood within the living vessels?
11. Outline a normal pulse tracing and explain the elevations and their relations.
12. Explain how the blood retains its alkalinity against an excessive acid diet.
Answer ten questions only.

MATERIA MEDICA, THERAPEUTICS, PHARMACOLOGY AND PRESCRIPTION WRITING.

1. Write a complete prescription for a 120 c.c. soln. containing tincture of nux vomica (0.5 c.c. to the dose) for internal use, and describe the therapeutic indications and the contraindications for the same.
2. Discuss the medical treatment of constipation in a woman fifty years of age.
3. Give the dosage of strychnine sulphate and of opium and discuss the action of each on the alimentary tract.
4. Discuss the dosage and mode of using calcium internally and its therapeutic action.
5. Discuss the dosage, modes of administration and therapeutic action of sodium phosphate.
6. Discuss fully the precautions to be taken in the use of mercury in the treatment of syphilis.
7. Discuss the general principles that should guide one in the therapy of typhoid fever.
8. Discuss the treatment of ancylostomiasis (uncinariasis), also the prophylaxis.
9. Discuss the therapy of rabies.
10. Discuss the medical treatment of diabetes mellitus.
11. Discuss the medical and dietetic treatment of early arteriosclerosis.
12. Discuss the therapy of mercurial stomatitis.
Answer ten questions only.

CHEMISTRY AND TOXICOLOGY.

1. (*a*) What is organic chemistry: (*b*) What are the general characteristics of organic compounds?
2. Name the principal derivatives of hydrocarbons.
3. Give general characteristics of metals of the iron group.
4. What does illuminating gas contain generally, and why is it toxic?
5. Give by volume, by weight, and by molecular weight, the components of water.
6. Write equation showing action of sulphuric acid on sodium chloride.

7. Give a test for sulphuric acid in vinegar.
8. Name five elements used in pure state in medicine.
9. What is the chemical treatment for creosote poisoning?
10. Mention antidotes for iodine poisoning.
11. Give a test for determining the presence of strychnine.
12. What metallic chemical substances are found in the body?

Answer ten questions only.

BACTERIOLOGY AND PATHOLOGY.

1. Define three varieties of cysts and give an example of each.
2. What forms may hemorrhage take and what is the fate of the effused blood?
3. What are ptomaine, toxalbumin, leucomaine?
4. Discuss arrhythmias of the heart, with special reference to heart block and fibrillation.
5. What is a parasyphilitic condition?
6. Of what help is embryology in the study of pathological conditions of the male genital tract?
7. Mention four diseases of protozoan origin and give short description of the causal organisms.
8. Discuss serum sickness.
9. Discuss chromogenic bacilli.
10. Discuss artificial immunization against typhoid fever and smallpox.
11. Discuss the pneumococcus of Fränkel and the pneumobacillus of Friedlander.
12. Differentiate gonococci from other cocci in pus from the urethra.

Answer ten questions only.

GENERAL MEDICINE.

1. What are the causes of hemorrhoids? Tell how the causes named produce them.
2. What complications may develop during or following acute gonorrheal urethritis?
3. Discuss empyema.
4. Upon what would you base a diagnosis of a tumor of the cerebellum?
5. Discuss tuberculosis of the spine.
6. Describe an attack of acute lobar pneumonia.
7. Describe the lesion of secondary syphilis.
8. Differentiate chancre, chancroid and herpes. When would you consider the case with the chancre cured?
9. What is the significance of a systolic blood pressure of 165 in a man of fifty? What should be done for him?

10. Diagnose and treat a case of acute anterior poliomyelitis.
11. Give etiology and treatment of a case of la grippe.
12. What is the significance: (*a*) of a tarry stool; (*b*) a clay colored stool; (*c*) a greenish frothy stool; (*d*) a hard lumpy stool?
Answer ten questions only.

OBSTETRICS AND GYNECOLOGY.

1. Describe syphilitic ulcer of the cervix uteri.
2. Give causes and treatment of cervical stenosis.
3. Discuss the merits of cæsarean section compared with other methods of relieving dystocia.
4. Describe the operation of cæsarean section.
5. What structures are divided in a complete laceration of the perineum? Describe in full operation for repair.
6. (*a*) Discuss non-specific cystitis in its relation to gynecology. (*b*) Discuss constipation in its relation to gynecology.
7. Give treatment of severe erosion and eversion of cervix with excessive mucopurulent discharge in woman pregnant at three months.
8. (*a*) Describe the fetal circulation and indicate changes occurring at birth. (*b*) What is a blue baby?
9. Give preventive treatment of: (*a*) Mastitis; (*b*) Ophthalmia neonatorum; (c) Puerperal infection; (*d*) Postpartum hemorrhage.
10. Gives differential diagnosis of pregnancy and distention of uterus due to retained menses.
11. When and how would you employ the following drugs in labor; Ergot, pituitrin; quinine; scopolamine; lobelia; gelsemium.
12. (*a*) When first consulted by a primipara, what should be the scope of your examination: (*b*) Why should an examination be made six to eight weeks following delivery.
Answer ten questions only.

SURGERY.

1. Describe in detail treatment of lacerated wound of scalp involving periosteum, and discuss possible dangers of improper treatment
2. What are the most important factors concerned in extensive postoperative thrombosis and embolism? Discuss the precautionary measures suggested for their prevention.
3. Classify ileus. Give symptoms and treatment.

4. Give some of the causes of delayed union in fractures and the treatment you would adopt for each of these causes.
5. Give indications for paracentesis membrani tympani. Describe operation in detail. What structures should be especially avoided.
6. Describe in detail and give method of reduction of backward dislocation of the thumb at the metacarpophalangeal joint.
7. How would you treat a penetrating wound of the cornea with incarceration of the iris?
8. Discuss hydronephrosis. Give treatment.
9. Discuss retropharyngeal abscess. Give treatment in detail.
10. Give symptoms and signs of malignancy of mammary gland. Give surgical treatment in detail.
11. Give causes and symptoms of fracture of base of skull.
12. Give etiology, pathology, symptoms, differential diagnosis and treatment of acquired flat-foot.
Answer ten questions only.

HYGIENE AND SANITATION.

1. Discuss the sanitation of an encampment of five thousand soldiers.
2. Define humidity of the atmosphere. What classes of diseases are most prevalent in a humid atmosphere?
3. What measures should be used on shipboard, or in camp, to eradicate scurvy?
4. What is sewer gas? How does the inhalation of sewer gas affect the system?
5. Discuss the agency of ptomaines in inducing diseases.
6. Name and describe the methods of five important infections and contagious diseases.
7. Discuss the prophylaxis of typhoid fever.
8. Give the medical and hygienic plan for the inspection and care of immigrants arriving at a seaport.
9. Discuss the theory of hereditary tendencies as applied to tuberculosis.
10. Describe the best method for eradication of hookworm from a community.
11. Give the prophylaxis of filth diseases.
12. Discuss the care of milk from dairy to customer.
Answer ten questions only.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF CALIFORNIA.

ANATOMY AND HISTOLOGY.

1. From the *epiblast* are derived: The skin and its appendages (hair, nails), and its glands (including the mammary glands); the nervous system (brain, spinal cord, ganglia, and nerves); the epithelial parts of the organs of special sense.

From the *hypoblast* are derived: The epithelial lining of the alimentary canal and its glands; the epithelial lining of the respiratory tract, Eustachian tube, thyroid and thymus.

From the *mesoblast* are derived: The skeleton; connective tissue; muscles and bones; heart, bloodvessels, lymphatics and spleen; the urinary and generative organs.

The tissues are: Epithelial, connective, muscle, nerve, and blood.

Epithelium consists of cells placed on free surfaces with very little intercellular substance.

Connective tissue is a general name given to several forms of tissue which support and connect the other tissues of the body; it is composed of cells and intercellular material.

Muscle consists of cells and fibres which can contract; three kinds are recognized: visceral, skeletal and cardiac.

Nervous tissue consists of nerve cells and fibres; the cells originate or receive nerve impulses and the fibres transmit the same.

Blood is a tissue in which the intercellular substance is fluid; the cells are of three kinds: Erythrocytes, leucocytes, and blood-plates.

2. The *heart* is located obliquely in the thorax, between the lungs, and enclosed in the pericardium. A line from the lower border of the second left costal cartilage (one inch from sternum) to upper border of third right costal cartilage (half inch from sternum) represents the *base line;* the *right side* will be a line drawn from right side of upper limit to seventh right chondrosternal articulation; the *lower limit* is a line from this last point to the apex (in fifth intercostal space three and one-half inches from mid-line); the *left side* from left end of upper border to left of apex. The heart lies opposite the fifth, sixth, seventh and eighth dorsal vertebræ.

The *aortic valves* are behind the third intercostal space close to the left side of the sternum. *Pulmonary valves* in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. *Tricuspid valves*, behind the middle of the sternum, about the level of the fourth costal cartilage. *Mitral valves* behind the third intercostal space, about one inch to the left of the sternum.

Its walls consist of muscle fibers, with some connective tissue to which many of the fibres are attached The heart is divided by a septum into a left and right heart; and each side is further divided into an upper chamber (auricle) and a lower chamber (ventricle), connected with valves so arranged that circulation of the blood only occurs in one direction. In the *right auricle* are the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculo-ventricular orifice. In the right auricle are also found the openings of the superior and inferior venæ cavæ, coronary sinus, foramina of Thebesius, the auriculo-ventricular opening, the fossa ovalis, annulus ovalis, tubercle of Lower, and the musculi pectinati. In the *right ventricle* are the tricuspid and semilunar valves; also the columnæ carneæ, chordæ tendineæ and the auriculo-ventricular opening and the opening of the pulmonary artery. In the *left ventricle* are the mitral and semilunar valves, the columnæ, chordæ tendineæ, and the aortic and auriculo-ventricular opening. The heart is about 5 x 2½ x 3½ inches, and weighs about ten ounces. It is supplied with blood by the right and left coronary arteries.

The nerve supply is from the superficial and deep cardiac plexuses, and from the vagus and sympathetic system. The *endocardium* is a thin translucent membrane, consisting of a lining of endothelial cells which rest upon a fibroelastic tissue. The endothelial cells are flattened and nucleated, and are of an irregular outline. The subendothelial tissue consists of a network of white fibrous and yellow elastic tissues. A few involuntary muscle fibers (non-striated) may also be present.

3. The *mandible* consists of a body and two rami. The body is horse-shoe shaped and contains the lower teeth; externally it presents the symphysis, mental process, mental foramen, incisive fossa, and external oblique line; internally it presents the four genial tubercles, sublingual fossa, internal oblique line, submaxillary fossa. The alveolar border has sixteen cavities for teeth. The ramus is quadrilateral, and presents the

inferior dental foramen and a spine. Above it has the coronoid and condyloid processes, separated by the sigmoid notch. The *muscles attached* are: Levator menti, depressor labii inferioris, depressor anguli oris, platysma myoides, buccinator, masseter, orbicularis oris, geniohyoid, geniohyoglossus, mylohyoid, digastric, superior constrictor of pharynx, temporal, internal and external pterygoids.

4. The *histology of lung tissue*: "In the lungs the bronchi branch in a tree-like manner, the final ramifications opening into the pulmonary cells. The larger intrapulmonary bronchi are lined by columnar ciliated epithelium resting on a basement membrane. Lying under this basement membrane are longitudinally disposed elastic fibers with loose connective tissue. More externally is a layer of smooth muscle fibers arranged circularly, the bronchial muscle. External to the bronchial muscle is a fibrous coat containing scattered, irregular plates of hyaline cartilage. The smaller bronchi (bronchioles) have no cartilaginous plates, but their muscular coat is well marked. Each bronchiole leads into a small number (three or four) of wider thin-walled spaces, lined by flattened epithelium, and called atria. Out of each atrium open two or three blind diverticula, each of which is called an infundibulum. The walls of the infundibula are studded with hemispherical sacs known as alveoli, which are lined by flattened, non-nucleated, epithelial cells. Between adjacent alveoli there is a dense network of capillaries, supported by a small amount of fine connective and elastic tissue; the network of capillaries is thus common to the two adjacent air cells, and the blood in the capillaries is separated from the air in the alveoli merely by two thin layers of epithelium. In birds, even the alveolar epithelium appears to be absent, the blood and air being separated solely by the capillary wall." (Bainbridge and Menzies', *Essentials of Physiology.*)

5. The *ovaries* are two in number, and correspond to the testes in the male; they are of a flattened ovoid form, vertically placed in the posterior part of the broad ligament. By its anterior border the ovary is connected to the broad ligament, and by its lower pole to the uterus by a proper ligament, extending to the superior angle of the uterus, and called the *ligament of the ovary.* The lateral surfaces and posterior borders are free. The superior pole and posterior border are embraced by the Fallopian tube; on its inner surface it is in relation with small intestine in Douglas' pouch, and externally lies in a peritoneal fossa between the

external and internal iliac vessels as they diverge. The vessels enter the hilum at the attached anterior border. —(*Aids to Anatomy.*) The *arteries* are the ovarian, from the aorta; the *nerves* are from the ovarian plexus and the aortic plexus.

Ovulation is the escape of a ripe ovum from a Graafian follicle.

Graafian follicle is a spherical body or vesicle, found in the outer part of the ovary, and which contains the matured ovum.

Corpus luteum is the scar on the surface of the ovary which marks the site of a ruptured Graafian follicle.

6. After ligation of the abdominal aorta, the collateral circulation is carried on by: (1) Internal mammary with deep epigastric; (2) internal mesenteric with internal pudic; (3) if above the inferior mesenteric, by superior mesenteric with inferior mesenteric.

7. The *hip-joint* is an enarthrodial joint, formed by the head of the femur and the acetabulum. The articular surfaces are covered with cartilage. Near the center of the head of the femur is attached the ligamentum teres. The *ligaments* are: (1) The capsular, which embraces the margin of the acetabulum above, and the neck of the femur below. (2) The ileofemoral or Y ligament, which passes obliquely across the front of the joint, and is attached above to the anterior inferior spine of the ilium, and below to the anterior intertrochanteric line. (3) The ligamentum teres. (4) The cotyloid ligament, which deepens the acetabulum, and bridges over the cotyloid notch, being there called (5) the transverse ligament. The joint has a very extensive synovial membrane. It is capable of the following movements: Flexion, extension, abduction, adduction, circumduction, and rotation.

The *muscles in immediate relation with the capsule* are: (1) *Above*, the rectus femoris and gluteus minimus; (2) *in front*, the iliopsoas; (3) *on inner side*, the pectineus and obturator externus; (4) *behind*, the pyriformis, obturator internus, two gemilli, obturator externus, gluteus minimus and quadratus femoris.

Synovial bursæ and *bursæ mucosæ* are identical. *Five examples*: Suprapatellar bursa, ischiogluteal bursa, olecranon bursa, bursa of tendo Achillis, and prepatellar bursa.

9. *Ganglia in connection with the fifth cranial nerve*: (1) *Gasserian ganglion*, situated in Meckel's cave near the apex of the petrous portion of the temporal bone; (2) *lenticular ganglion*, situated in the back part of the orbit; (3) *Meckel's ganglion*, in the sphenomaxil-

lary fossa; (4) *otic ganglion*, situated immediately below the foramen ovale; (5) *submaxillary ganglion*, situated above the deep portion of the submaxillary gland.

Of the first division, the lacrimal inosculates with the facial; the supratrochlear with the infratrochlear; the supraorbital with the facial; the nasal with the facial; infratrochlear with supratrochlear.

Of the second division, the temporal inosculates with the facial; the malar with the facial; the posterior superior dental with the middle superior dental; the inferior palpebral with the facial and malar; the nasal with the nasal from the first division.

10 and 12, SOLEUS; *insertion*, by tendo Achillis into posterior surface of os calcis; *nerve supply*, internal popliteal and posterior tibial; *action*, extends ankle.

TIBIALIS POSTICUS; *insertion*, scaphoid, cuboid, cuneiform, second, third and fourth metatarsals, and sustentaculum tali; *nerve supply*, posterior tibial; *action*, extends ankle, flexes tarsal joints, and inverts foot.

PRONATOR RADII TERES; *insertion*, middle of outer surface of radius; *nerve supply*, median; *action*, flexes elbow and pronates forearm.

SCALENUS ANTICUS; *insertion*, scalene tubercle on upper surface of first rib; *nerve supply*, branches of lower cervicals; *action*, raises ribs, flexes spine, and bends neck to same side.

QUADRATUS FEMORIS; *insertion*, posterior intertrochanteric ridge and below on shaft of femur as far as insertion of adductor magnus; *nerve supply*, sacral plexus; *action*, external rotator and adductor of thigh.

BICEPS FEMORIS; *insertion*, outer side of head of fibula; *nerve supply*, great sciatic; *action*, flexes knee, extends thigh and rotates leg outward.

SARTORIUS; *insertion*, inner side of upper part of tibia, by side of tubercle; *nerve supply*, middle cutaneous, or anterior crural; *action*, flexes hip and knee, abductor and external rotator of thigh.

OBTURATOR INTERNUS; *insertion*, upper and front part of great trochanter of femur; *nerve supply*, sacral plexus; *action*, external rotator of thigh.

PLATYSMA; *insertion*, mandible, and opposite platysma; *nerve supply*, facial; *action*, moves skin of neck, slight depressor of lower jaw.

TEMPORAL; *insertion*, front and internal surface of coronoid surface of mandible; *nerve supply*, inferior maxillary; *action*, muscle of mastication, closes mouth, and protrudes and retracts lower jaw.

11. TRAPEZIUS; *origin*, spinous processes of seventh

cervical and all thoracic vertebræ, supraspinous ligament, ligamentum nuchæ, and inner third of superior curved line of occipital bone; *nerve supply*, spinal accessory, and cervical plexus.

GASTROCNEMIUS; *origin*, posterior part of inner condyle and line above it, and lateral surface of outer condyle of femur; *nerve supply*, internal popliteal.

LATISSIMUS DORSI; *origin*, spinous processes of lower six thoracic vertebræ, supraspinous ligament, lumbar and sacral spines, and outer edge of crest of ilium; *nerve supply*, long subscapular.

BICEPS CUBITI; *origin*, upper border of glenoid cavity of scapula, glenoid ligament, and apex of coracoid process of scapula; *nerve supply*, musculocutaneous.

STERNOMASTOID; *origin*, upper and anterior part of manubrium, and inner and upper surface of clavicle; *nerve supply*, spinal accessory.

OMOHYOID; *origin*, upper border of scapula behind the notch, and transverse ligament; *nerve supply*, first, second and third cervicals.

PECTORALIS MINOR; *origin*, outer surface of third, fourth, and fifth ribs, just external to the costal cartilages; *nerve supply*, internal anterior thoracic.

BRACHIORADIALIS; *origin*, lower half of outer and inner surfaces of shaft of humerus, all inner intermuscular septum and outer part of outer intermuscular septum; *nerve supply*, musculospiral and musculocutaneous.

RECTUS FEMORIS; *origin*, anterior inferior spine of ilium, and groove above the acetabulum; *nerve supply*, anterior crural.

INTERNAL OBLIQUE; *origin*, outer half of Poupart's ligament, anterior ⅔ of middle crest of ilium, and fascia lumborum; *nerve supply*, lower intercostals and iliohypogastric.

PHYSIOLOGY.

1. The regulation of the distribution of blood on change of position is brought about by the vasomotor system. This system causes a dilatation of the vessels in those parts requiring more blood and a constriction of the vessels in those parts requiring less blood.

2. The vagus nerve contains two sets of fibers; one set inhibits inspiration and causes expiration and is stimulated in ordinary inspiration by the expansion of the lungs; the other set of fibers causes inspiration and inhibits expiration, and is excited in strong expiration by collapse of the lungs.

3. Peristalsis in the esophagus is more closely connected with the nervous system than is peristalsis in

the intestine; and it can pass over any muscular block caused by ligature, cutting or crushing, so long as the nervous connection is not involved. Stimulation of the mucous membrane of the pharynx will also cause peristalsis in the esophagus.

4. The movements of the large intestines differ from those of the small intestines mainly in the great frequency of antiperistalsis.

5. Defecation is partly voluntary and partly reflex. In the infant the voluntary control is not developed, in the adult it may be lost; it is then reflex. As a rule the rectum is empty till just before defecation; at that time the feces descend into the rectum from the pelvic colon, and their passage from colon to rectum constitutes the call to defecation. The sensation is due to distention of the rectum. The descent of the feces from colon to rectum is due to a reflex peristalsis caused by the taking of food into an empty stomach or to the muscular activity of dressing. The sphincters are normally in a state of tonic contraction, but they are relaxed by the inhibition of a center in the lumbar enlargement of the spinal cord. This relaxation is partly voluntary and partly reflex.

6. Living tissues are protected by the body fluids (chiefly blood and gastric juice); and the acidity of the urine and of the gastric juice, and the alkalinity of most of the other secretions aid in protection against evil influences; the phagocytic action of the blood is similarly a protection; the blood and lymph are bactericidal in their action; the agglutinating action of the blood is a further protection. The living body is also capable of producing antitoxins.

7. The rhythmical beat of the heart is probably due to the inherent rhythmicality in the heart muscle; it is therefore of myogenic origin, but it starts in the sinus, where this power is best developed, and the ventricle responds to the stimulus. That the rhythmicity is not due to nervous influences is proved by the fact that in some animals if the heart is excised the rhythmical beat will still continue for many hours.

8. "The growth of a neuron from origin to completion is a comparatively slow process in the higher animals. Early in fetal life (about the third or fourth week in man) certain round germinal cells make their appearance amid the columnar ectodermic cells surrounding the neural canal. From their division are formed, in the first months of embryonic life, the primitive nerve cells or neuroblasts. These soon elongate and push out processes, first the axon or axons, and

then the dendrites. As development goes on, the cell body grows larger, and the processes longer and more richly branched. The axon and its collaterals, when it has any, in the case of the great majority of the nervous elements of the brain and cord, ultimately acquire a medullary sheath, although the time at which medullation is completed varies in different groups of elements, and in some nervous tracts it is even wanting at birth. At birth, too, the branches of many of the cells are less numerous, and the connections between different nervous elements therefore less intimate than they will afterwards become. For many years the processes, and particularly the axons, continue not only to grow longer, but to grow thicker as well. The cell body also enlarges, and the quantity of material in it that stains with basic dyes increases. The cross section of the axis cylinder is, and remains, almost exactly equal to the area of the medullary sheath. Even after puberty is reached the anatomical organization of the nervous system may continue to advance, although at an ever slackening rate, and the finishing touches may only be given to its architecture in adult life. In old age the nervous elements decay as the body does. The cell body diminishes in size; the stainable material lessens in amount; vacuoles form in the protoplasm and pigment accumulates; the nucleus shrinks; the nucleolus is obscured or may disappear altogether. At the same time the processes of the cell, and especially the dendrites, tend to atrophy."—(Stewart's *Manual of Physiology*.)

9. Transfusion of a moderate amount of fluid will increase the blood pressure, but only for a short time, owing to the rapid adaptability of the peripheral resistance.

10. Why blood does not coagulate within the living vessels is a question which has not been settled. It is believed that the liver cells produce an antibody called antithrombin; this antithrombin neutralizes the fibrin enzyme or thrombin which is normally present in the blood stream and which is an essential factor in the process of coagulation.

11. "In a normal arterial pulse tracing the ascent or anacrotic limb is abrupt and unbroken; the descent or catacrotic limb is more gradual, and is interrupted by one, two, or even three or more, secondary wavelets. The most important and constant of these is the third one, which has received the name of the dicrotic wave. Usually less marked, and sometimes absent, is the second wavelet between the dicrotic elevation and

the apex of the curve. It is generally termed the predicrotic wave. Oscillations, due to vibrations of the recording apparatus, appear on many pulse tracings, and it is important to recognize their cause, so that no weight may be given to them."—(Stewart's *Manual of Physiology.*)

12. "The reaction of the blood to litmus is alkaline, but when it is determined accurately in terms of H ion concentrations, it is found to be almost the same as that of distilled water. Under various conditions the reaction may alter slightly, and these changes produce marked physiological effects in the body, although they are usually too slight to affect an ordinary indicator, such as litmus. Further, the presence in blood of proteins and phosphates makes it possible for a considerable amount of acid or alkali to be added to blood without any appreciable change being produced in the H ion concentration. The reason is that the acid or alkali thus added combines with proteins or phosphates to form compounds which do not undergo ionic disassociation, and therefore does not alter the concentration of H ions by which the reaction of the blood is ultimately determined. For example, Na_2HPO_4 can be partly converted into NaH_2PO_4 on the addition of acid, with little or no alteration in the number of free H ions present in the solution."—(Bainbridge and Menzies' *Essentials of Physiology.*)

MATERIA MEDICA, THERAPEUTICS, PHARMACOLOGY AND PRESCRIPTION WRITING.

1. ℞. Tincture nucis vomicæ..... 16.00 c.c.
Tincturæ gentianæ compositæ. 60.00 c.c.
Aquæ q.s. ad..... 120.00 c.c. M.

Sig.: Take one teaspoonful in water, half hour before meals.

This prescription is intended as a tonic, appetizer, stimulant, or stomachic.

Nux vomica is particularly employed in conditions characterized by loss of appetite, indigestion, weakness, and other evidences of lowered vitality. It is further used in cases of gastric catarrh, constipation, diarrhea, pneumonia, typhoid, hysteria, anemia and chlorosis, neuralgia. It is contraindicated in acute inflammatory conditions of the spinal cord, and when there is excessive reflex irritability.

2. Medical treatment for constipation should not be tried till other means have failed. Good and regular habits, hygiene, exercise, and diet should all be thought of and suggested. Then purgatives may be tried, with the object of unloading the bowel. Rhubarb, castor

oil, mercury, senna, or jalap may be given. To cure the tendency to constipation, cascara, sodium phosphate, manna, aloes, and podophyllin have been recommended. All drugs of this type lose their efficacy after a time, and the dose has to be increased. The compound cathartic pill and vegetable cathartic pill are useful. Enemata of soap and water, with a little turpentine or olive oil, have proved beneficial.

3. Dose of strychnine sulphate is 1/40 grain.

Dose of opium is 1 grain.

Strychnine increases the peristaltic action of the intestines, is a stomachic tonic, improves the appetite, aids digestion, stimulates the flow of saliva and increases the flow of gastric juice.

Opium checks the secretion of saliva and the flow of gastric juice, diminishes the secretion of bile and pancreatic juice, lessens peristalsis and impairs digestion. Very large or very small doses, however, are said to increase peristalsis.

4. *Calcium* itself is not used in medicine. *Calcium bromide* is used as a nerve sedative, in doses of 30 grains. *Precipitated calcium carbonate* is an antacid and mild astringent, and is used in cases of gastric acidity, and for controlling diarrhea; dose 20 grains. *Calcium chloride* is used in cases of rickets, glandular enlargement, lupus, purpura, hemophilia and tuberculous conditions; dose 20 grains. *Calcium hyphophosphite* is said to be a stimulant of nerve tissue; it is used in the treatment of rickets, osteomalacia, tuberculosis, ununited fractures; dose 8 grains. *Calcium phosphate* is used as a feeble antacid, also in cases of rickets, ununited fractures, dental caries; dose 20 grains. *Calcium oxide* is used as an antacid and in cases in which bone salts are deficient; it is added to cow's milk to make it more digestible and less inclined to curdle in the stomach. *Chlorinated lime* is used for stomatitis and as a gargle for putrid sore throat; dose 2 grains. *Calx sulphurata* is used for boils and acne; dose 20 grains.

5. *Sodium phosphate* is used as a saline laxative in 20 to 30 grain doses, with plenty of water. It is also said to be useful in cases of gallstones and diseases of the liver, as well as in nervous diseases.

6. *Precautions to be taken in administering mercury:* "Owing to the marked tendency of mercury to produce stomatitis, the greatest care should be exercised in the hygiene of the mouth. Before beginning the administration of this drug the patient should be sent to a competent dentist and have his teeth treated,

including the filling of cavities, the removing of old stumps, and a thorough cleansing. If pyorrhea exists, it should be determined by microscopical examination if the *endamœba buccalis* is present, and if so some emetine should be administered. During mercurial treatment all particles of food should be removed from between the teeth with dental floss, and they should be brushed carefully after each meal with some good dentifrice. A mouth wash should also be used frequently during the day; this may consist simply of a 4 per cent. solution of potassium chlorate. The urine should be examined at frequent intervals for evidence of nephritis."—(*Syphilis*, by Thompson.)

7. In *typhoid fever* the patient should be placed in bed in a quiet and well ventilated room; an intelligent nurse is necessary. The utmost cleanliness of the patient, bedding, sick-room requisites, etc., must be observed. The patient's strength must be conserved in every way possible; the infection must not be allowed to reach others; the diet must be suited to the patient, and must be given frequently; drugs are only to be given when there is a distinct need for them; the patient must be carefully watched for the first sign of complications; the best method for reducing the body temperature is the use of the Brand bath; the patient should be allowed plenty of water to drink.

8. *Uncinariasis* is best treated by thymol; this is given in capsules containing 20 grains after the patient has been purged with sodium phosphate; the thymol is also followed by a saline purge. Two or three such capsules may be required. Prophylaxis consists in boiling the drinking water, washing the hands before eating, and careful disinfection of feces, or proper toilet facilities; "carriers" must be treated.

9. *Rabies* is treated by the Pasteur method; do not kill the dog, but keep it and watch it, and if it has rabies give the patient the Pasteur treatment; if at the end of a week the dog shows no signs of rabies, there is no need to treat the patient. The wound should be cauterized with nitric acid and then dressed antiseptically.

10. *Medical treatment of diabetes mellitus:* Tonics, like arsenic, iron and strychnine are often useful. Opium proves efficacious in some cases. It is best given in the form of codeine (½ grain three or four times a day). Salicylates have been strongly recommended. Bromides are serviceable in subduing nervous manifestations. Alkaline carbonates and alkaline mineral waters have long enjoyed a reputation. Upon

the recognition of the early signs of *coma*, a moderate amount of readily digestible carbohydrate should be added to the diet. Absolute rest should be enforced, saline laxatives and diuretics (theobromine, caffeine), should be administered, and large doses (1 to 2 ounces) of sodium bicarbonate should be given daily. Developed coma is rarely relieved by *intravenous* injections of 4 per cent. solution of sodium carbonate (a liter, if possible, and repeated if necessary at end of six hours)."—(Stevens' *Practice of Medicine.*)

11. In *early arteriosclerosis* the causative factors of the disease should be treated; the patient must be saved from mental and physical strain; the diet should be chiefly vegetarian, and alcohol and red meat must be avoided. Long hours of sleep and much rest are beneficial; daily warm baths, massage and passive exercise have proved of service. Saline laxatives may reduce the hypertension; iodide of potassium, nitroglycerin, amyl nitrite, choral hydrate, and morphine are the drugs most often used, but they must be selected and prescribed with care and not in a routine fashion.

12. In *mercurial stomatitis* the patient must stop the use of the mercurial; potassium iodide, in small doses, is serviceable. Solution of potassium chlorate may be used as a mouth wash, and atropine may be given to check the excessive secretion of saliva. Tonics are often necessary.

CHEMISTRY AND TOXICOLOGY.

1. *Organic chemistry* is the chemistry of the carbon compounds. *Organic compounds* may be either gases, liquids, or solids (crystalline or amorphous); volatile or non-volatile; have any variety of taste, and color; and are very prone to change when acted upon by heat or chemical reagents; and the more complex they are the greater is their liability to change.

2. The *principal derivatives of the hydrocarbons* are: The haloid derivatives, various oxidation products (alcohols, aldehydes, ketones, carboxylic acids, ethers, esters), carbohydrates, sulphur derivatives, metallic compounds, nitrogen derivatives (amines, nitrils, amides, ammonium derivatives, cyanogen compounds, compound ureas), and phosphorus, arsenic and antimony derivatives.

3. *Metals of the iron group* form two series of compounds, as ferrous and ferric. In the former series the metal is bivalent; in the latter it is quadrivalent, and two atoms of this quadrivalent element combine exchanging a valence between them and so forming a

hexavalent group. Thus, $FeCl_2$, ferrous chloride; $Fe \equiv Cl_3$ | = Fe_2Cl_6, ferric chloride. $Fe \equiv Cl_3$

4. *Illuminating gas* contains: Hydrogen, methane, ethane, carbon monoxide, carbon dioxide, nitrogen, ammonia, hydrogen sulphide, hydrocyanic acid, acetylene, and other compounds.

Its *toxic properties* are due to the carbon monoxide, and to the mixture of other ingredients, chiefly carbon dioxide, hydrogen sulphide, methane and ammonia.

5. *Water* contains one volume of oxygen and two volumes of hydrogen; or by weight eight parts of oxygen and one part of hydrogen; by molecular weight, sixteen parts of oxygen and two parts of hydrogen.

6. $H_2SO_4 + 2NaCl = Na_2SO_4 + 2HCl$,
or $H_2SO_4 + NaCl = NaHSO_4 + HCl$.

7. *Test for sulphuric acid in vinegar:* Add some cane sugar and evaporate; if the sugar turns black, sulphuric acid is present.

8. *Five elements used in a pure state in medicine:* Iron, carbon, sulphur, phosphorus, and oxygen.

9. The *chemical treatment for creosote poisoning* consists in washing out the stomach with alcohol and water and the administration of sodium sulphate or magnesium sulphate.

10. *Antidotes for iodine poisoning:* Starch, and sodium thiosulphate.

11. *Test for strychnine:* It forms a colorless solution with concentrated sulphuric acid; if a crystal of potassium dichromate is drawn through this solution it is followed by a trail of color, blue, violet, rose, and yellow.

12. *Metallic chemical substances found in the body:* Iron, sodium, potassium, calcium, magnesium, lithium, and occasionally manganese, copper, and lead.

BACTERIOLOGY AND PATHOLOGY.

1. *Three varieties of cysts:* (1) *Retention cysts*, which result from the retention of normal secretions, such as sebaceous cysts. (2) *Exudation cysts*, which result from excessive secretion in cavities which have no excretory duct, such as hydrocele. (3) *Congenital cysts* which may be due to blighted ova, or inclusion of epiblast; such are dermoid cysts.

2. *Forms of hemorrhage:* (1) By *rhexis*, when it occurs from rupture of a blood vessel; (2) by *diapedesis*, when it passes through the vessel walls without rupture of the latter; (3) very small hemorrhages,

which are called *petechiae;* (4) larger hemorrhages into the tissues, called *ecchymoses;* (5) infiltration of a portion of tissue with blood, called a *hemorrhagic infarction;* (6) a tumor-like mass of blood, called a *hematoma.*

Fate of the effused blood: "The extravasated blood in the tissues usually coagulates, although exceptionally it remains fluid for a long time. A certain number of the white blood cells may wander into adjacent lymph vessels, or they may remain entangled with the red cells in the meshes of the fibrin. The fluid is usually soon absorbed; the fibrin and a portion of the white blood cells disintegrate and are absorbed. The red blood cells soon give up their hemoglobin, which decomposes and may be carried away or be deposited either in cells or in the intercellular substance at or near the seat of the hemorrhage, either in the form of yellow or brown granules or as crystals of hematoidin. Sometimes all trace of extravasations of blood in the tissues disappears, but frequently their seat is indicated for a long time by a greater or less amount of pigment or by new formed connective tissue. Occasionally the blood mass, in a more or less degenerated condition, becomes encapsulated by connective tissue, forming a cyst."—(Delafield and Prudden's *Pathology.*)

3. *Ptomaines* are products which result from the action of bacteria upon proteid material.

Leucomaines are similar products formed in the body as the result of normal proteid metabolism, and are not due to bacterial action.

Toxalbumins are poisonous substances elaborated by bacteria during their growth; they are capable of producing disease.

Arrhythmia is an alteration in the normal cardiac rhythm. It may depend upon disturbances of the nervous mechanism of the heart or upon disturbances arising within the heart muscle. The neurogenic form may be caused by strong emotions, tobacco, alcohol, bacterial poisons, by meningitis or cerebral lesions causing increased intracranial pressure, and by impressions from stomach or intestines which act upon the heart in a reflex manner. There are several types of myogenic arrhythmia, of which auricular fibrillation and heart block are among the most important.

Auricular Fibrillation.—In this condition the uniform contractions of the auricle as a whole are replaced by a multitude of haphazard fibrillary contractions, and as a result the ventricular beats, and hence

grossly irregular, both as to
The pulse rate is, as a rule, in-
but it may be nearly normal, or if
decreased. Auricular fibril-
is the result of inflammatory or degenerative
in the myocardium, and is especially common
valvular disease.

—This form of arhythmia is due to the
of the auricular contractions to reach the
owing to defective conductivity in the bundle
In complete heart-block the conducting func-
of the bundle is entirely lost and the ventricle de-
an independent rhythm of its own, the pulse
usually regular and numbering about 30 per
In partial heart-block the conductivity of the
is merely impaired, the result being a prolonga-
of the interval between the auricular and the
ventricular contractions, or the dropping of one ventri-
cular beat in 3, 4, 5, etc. Heart-block may result from
organic lesions in the conducting bundles, such as
fibrosis, gummata, sclerosis, etc., from infectious toxemias
or from the action of certain drugs, especially digitalis.
In some cases of complete heart-block (occasionally
seen in the absence of it) the *Adams-Stokes syndrome*
develops. This is characterized by a very infrequent
pulse (5 to 10 per minute) and recurring attacks of
syncopal, epileptiform, or vertiginous character,
probably the result of cerebral anemia. In the aged
the Adams-Stokes syndrome is almost invariably an
expression of degenerative myocarditis; in young
adults it is usually indicative of syphilitic myocarditis,
although in rare instances it may be of nervous origin.
(Osler's *Principles of Medicine.*)

A cerebrospinal condition is one which is not of
syphilitic nature but is believed to be of syphilitic
origin, such as tabes dorsalis, and general paresis.

Many of the anomalous conditions of the male
genital tract are due to some error of development, and
it is only by a knowledge of their embryology that such
conditions are clearly understood. Among such anom-
alous conditions may be mentioned hypospadias, epis-
padias, undescended testicle, teratoid tumors, and
hydrocele (true and false).

Infectious diseases of protozoan origin: Malaria,
syphilis, amebic dysentery, and trypanosomiasis.

Malaria is caused by the *Plasmodium malariæ*,
which is conveyed to man by the anopheles mosquito.
There are three different varieties of plasmodium; the
tertian malaria, or quartan parasite, is a unicel-

lular parasite which appears inside the red blood cells as a small, unpigmented, irregular, hyaline body, capable of ameboid movement; pigmented granules appear, and some fill up the center of the blood corpuscle, and later the parasite splits into from six to twelve segments which, with the pigment, escape into the circulation. It requires three days for its development. The *Hemameba vivax*, or tertian parasite, requires only two days for its development. It is larger than the quartan parasite, and the pigment particles appear earlier and are actively motile; the parasite splits into fifteen to twenty segments which are small and round. It contains more granules than the quartan parasite, but they are smaller. The *Hemameba falciparum*, or æstivo-autumnal parasite, is smaller than the other two, but is more active; when at rest it assumes the signet-ring form; the pigment develops within twenty-four hours in coarse granules located in the center of the cell; the parasite becomes lobulated and rosette-shaped, and splits into six to twelve segments.

Syphilis is due to infection by the *Treponema pallidum*, also called the *Spirochæta pallida*. This is a slender spirillum, with regular turns, the curves varying in number from three or four to twelve or even twenty; it is about 4 to 20 microns long, actively motile, with a fine flagellum at each pole; it is flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur.

Amebic dysentery is due to the *Entamæba histolytica*, which is about 15 to 50 microns in diameter; it has short, blunt pseudopods, vacuoles, a nucleus and refractive granules. *Trypanosomes* have a long, spiral body, 8 to 35 microns in length, to one side of which is attached a membrane which is continued as a flagellum. The flagellum arises in a small granule near the posterior end, called the blepharoplast.

8. *Serum sickness.*—"About one-third of the persons injected with horse serum for the first time are found to be sensitive to it, an urticaria, more or less edema, and sometimes arthritis, appearing between the sixth and twentieth days after injection. The only explanation offered is that part of the serum used as an injection remains unaltered in the subject, while the remainder sensitizes the serum of the subject. In fact, a sort of auto-anaphylaxis occurs."—(*Aids to Bacteriology.*)

9. *Chromogenic bacilli.*—"A large number of bac-

teria, when cultivated upon suitable media, give rise to characteristic colors which are valuable as marks of differentiation. For each species the color is usually constant, depending to a certain extent upon the conditions of cultivation. In only a few of the pigmented bacteria is the pigment contained within the cell body, and in only one variety, the sulphur bacteria, does the pigment appear to hold any distinct relationship to nutrition. In most cases, the coloring matter is found to be deposited in small intercellular granules or globules. The absence of any relationship of the pigment to sunlight, as is the case with the chlorophyl of the green plants, is indicated by the fact that most of the chromobacteria thrive and produce pigment equally well in the dark as they do in the presence of light. Among the most common of the pigment bacteria met with in bacteriological work are staphylococcus pyogenes aureus, bacillus pyocyaneus, bacillus prodigiosus, and some of the green fluorescent bacteria frequently found in feces."—(Hiss and Zinsser's *Bacteriology*.)

10. *Antityphoid inoculation* has been thoroughly tested, especially in the American army, and is of the greatest value. It is useful for those who have to live in infected localities, and for those who attend typhoid patients. By this means typhoid can be reduced to a minimum. Leishman reports: "In 5473 soldiers vaccinated against the disease, 21 took it and 2 died; in 6610 soldiers practically under the same conditions, who were not vaccinated, there were 187 cases and 26 deaths; that is, among the vaccinated soldiers there were 3.8 cases per thousand, and among the unvaccinated 28.3 per thousand."

Vaccination against smallpox, if properly performed, and made compulsory, would prevent, if not entirely exterminate the disease. Osler says "the German army since 1874, the date of the stringent laws (on compulsory vaccination) has enjoyed practical immunity—not a single death from smallpox (to the date of the last report, 1902), except an isolated case under peculiar circumstances in 1884-85."

11. The *pneumococcus of Fränkel* is a diplococcus, small, spherical, non-motile, non-flagellate, non-sporogenous; it is aerobic and optionally anaerobic, and does not produce pigment or liquefy gelatin. It is Gram positive and stains by the ordinary methods. The *pneumobacillus of Friedlander* is an encapsulated bacillus, non-motile, non-flagellate, non-sporogenous; it is aerobic and optionally anaerobic, and does not produce

pigment or liquefy gelatin. It stains by ordinary methods, but is negative to Gram's stain.

12. The *gonococcus* is found within the pus cells, has the characteristic coffee-bean form, and is decolorized by Gram's stain. None of the other pus cocci have these distinguishing characters.

GENERAL MEDICINE.

1. *Causes of hemorrhoids:* (1) Constipation, by inducing hardened stools felt at the anal orifice; (2) heavy printed paper used as a detergent may have the same effect; (3) diarrhea or any other discharge from rectum or vagina may act as an irritant; (4) force or exertion, such as straining at stool, may cause the rupture of the wall of a vein in the neighborhood of the anus; (5) pressure, from liver, tight lacing, pregnant uterus, or abdominal tumor, particularly when added to inflammatory processes, may cause hemorrhoids; (6) sedentary habits, by causing dilatation of the veins and congestion of the parts.

2. *Complications of gonorrheal urethritis:* Balanitis, chordee, protatitis, seminal vesiculitis, epididymitis, orchitis, cystitis, nephritis, pyelitis, prostatic abscess, retention of urine, paraphimosis, bubo, infection of Cowper's glands, conjunctivitis. In the female, the infection may spread to bladder, ureter, kidney, and also to Bartholin's glands, vagina, uterus, Fallopian tubes, ovaries, and peritoneum.

3. EMPYEMA. *Etiology:* Wounds, injuries, pleuropneumonia, direct extension of a suppurative process in the lung, abdomen, or neck. The bacteria will vary with the cause; *Diplococcus pneumoniæ* is the commonest; tubercle bacillus, staphylococcus, streptococcus, *Colon bacillus* may also be present.

Pathology: The organisms causing it are pneumocci, streptococci, staphylococci, tubercle bacilli, *Bacillus coli*, and actinomycosis.

The physical signs are those of fluid in the pleural cavity; that side does not move well, the percussion note is dull, there is absence of breath sounds, vocal fremitus and resonance are diminished. Left alone, an empyema may burst through an intercostal space, usually the fifth. The lung is collapsed in extent according to the amount of pus. The pleura, at first covered with lymph, soon becomes covered with layers of granulation tissue, the deeper part of which is converted into fibrocicatricial tissue, and the lung itself also undergoes some fibroid change. If the pus is let out early the lung and pleura soon expand, but if al-

lowed to go on the infiltration of the lung and the density of the scar tissue covering it hinder expansion. Nature attempts to remedy this in various ways: (1) The other lung expands and pushes the heart over to the opposite side; (2) the chest wall falls in, the intercostal spaces are obliterated, and the spine is curved, with its concavity toward that side; (3) the abdominal viscera are pushed up: and (4) exuberant granulations form on the pleura. If a cavity still remains an operation is necessary.

Symptoms: Fever, sweats, chill, diminished breath sounds and vocal fremitus, impaired mobility of chest, dullness on affected side, heart displaced to opposite side, leucocytosis.

Treatment: Aspiration, drainage, irrigation, resection of ribs (Estlander's operation), or resection of chest wall (Schede's operation). Operation of some sort is the only treatment.

4. *Tumors of the cerebellum* produce the following symptoms: "Vomiting is quite frequent. Optic neuritis with blindness occurs very early, and paralysis of the external rectus muscle is very common and often bilateral. There is also apt to be rigidity of the neck, and involvement of the olfactory, oculomotor, and trigerminal nerves on the side of the tumor. One of the most characteristic symptoms is a severe occipital headache, most marked upon arising. Attacks of amyasthenia and general vertigo are also frequent. Another characteristic symptom is the so-called cerebellar ataxia. This latter is especially marked in children, who have a tendency to fall to one side in walking, usually toward that upon which the tumor is situated." —(Eisendrath's *Surgical Diagnosis.*)

5. *Tuberculosis of the spine:* "There is usually a history of injury. The most common situation is at the junction of the lumbar and dorsal regions, and the bodies of the vertebræ are most often involved. Deformity follows, and depends upon the location and amount of destruction. In most cases the spine sinks forward, the spinous processes project backward, and compensatory curves in the opposite direction are developed above and below. *The symptoms* are pain, tenderness on pressure, rigidity of the back, and a sense of weakness, which may usually be recognized by the child's actions. When suppuration occurs, the pus may enter the sheath of the psoas, destroying the muscle, and presenting in the iliac fossa or groin as an iliac or *psoas abscess;* or it may pass backward through or external to the quadratus lumborum, and point in the loin,

when it is known as *lumbar abscess*. In the cervical region *retropharyngeal abscess* may occur. Spinal paralysis may come on at any time and myelitis develops in the later stages. *The treatment* in most cases is that of tuberculosis in general. Rest in bed, using sand bags as splints, is the first consideration. After the acute symptoms have subsided, a Thomas splint, Sayre's plaster case, or Cocking's felt jacket may be applied to the back and the patient gradually allowed to move about. *To apply the plaster-of-Paris case*, the patient should be suspended so that the heels are just off the ground. A skin-fitting vest is then applied to the trunk, under which a stomach-pad is inserted, which should be removed after the plaster has become dry. Plaster bandages should now be applied in the usual manner, extending from the level of the axilla to just below the crest of the ilium. When the case is dry, it may be divided down the front and perforated, so that it can be laced up or removed at any time. Abscesses should be opened early and freely, and injections of iodoform emulsion will be found very beneficial. Laminectomy is sometimes advisable."—(*Pocket Cyclopedia.*)

6. "*Pneumonia* is an acute specific disease, due to infection with the diplococcus pneumoniæ (pneumococcus of Fraenkel) and, less frequently, with other microorganisms, characterized by a fibrinous exudation into the pulmonary air-cells and bronchioles, and following a course that is more or less typical, the chief symptoms being those of toxemia and of interference with the respiratory and circulatory functions. It usually occurs in early adult life during the winter months, and affects women most often. It may result from surgical operations, ether narcosis, previous attacks, infectious fevers, nephritis, alcoholism, heart-disease, etc.

The affection is divided into 3 stages: Congestion, consolidation, and resolution.

The first stage is characterized by sudden onset with chill, a sharp pain in the side, rise of temperature, a short and sharp cough, rusty-colored, viscid sputum, and dyspnea. There may be headache, insomnia, scanty urine with diminution of urea, chlorides, phosphates, and sulphates, insomnia, and herpetic vesicles on the face, and there is always an increase in the number of leukocytes in the blood. Physical examination will reveal diminished expansion, impairment of the normal percussion note, feeble or suppressed respiratory murmur, moist or dry râles, crepitation, and sometimes a pleural friction sound.

In the second stage the dyspnea is more marked; the

face is more or less livid in color; the temperature is high (104°-105° F.); and the pulse increases in rate (110-120), its tension and fullness lessening with the progress of the disease, and growing feeble and intermittent. Headache, delirium, and various other nervous symptoms may be present. Expansion is diminished and vocal fremitus is exaggerated upon the affected side. There is dullness with increased resistance over the consolidated lung, and auscultation detects bronchophony or bronchial breathing over this same area.

The third stage is ushered in by a sudden drop of temperature on or about the fifth or ninth day, followed by a natural sleep, free sweating, and relief from suffering. In this stage the subcrepitant râle (râle redux) is heard in the midst of the bronchial breathing, together with numerous moist râles. Dullness may persist for some time, but usually by the twelfth or fourteenth day the lung has returned to its normal state."—(*Pocket Cyclopedia.*)

7. The *secondary* symptoms of syphilis are the cutaneous eruption (or syphilides) and the mucous patches in the mouth, condylomata around the anus or in the groins, ulceration of the throat, loss of hair, anemia, nocturnal headaches, pains in the bones, iritis and periostitis. The *skin lesions* are characterized by being roughly symmetrical, of a raw ham or copper color, of roughly circular outline, and not accompanied by itching; macules, papules, pustules, and scales may all be present at the same time in different parts of the body.

8.

CHANCRE.	CHANCROID.	HERPES PROGENITALIS.
First lesion of a constitutional disease, viz., syphilis.	A local disease.	A local neurosis.
Due to syphilitic infection.	Due to contact with secretion from chancroid.	Due to irritation.
Generally a venereal infection.	Always a venereal infection.	May be non-venereal.
May occur anywhere on the body.	Nearly always on genitals.	Occurs generally on prepuce; may occur anywhere on genitals.

CHANCRE.	CHANCROID.	HERPES PROGENITALIS.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three.	No incubation period.
Generally single.	Generally multiple.	Multiple vesicles occurring in crops.
Not autoinoculable.	Autoinoculable.	Not autoinoculable.
Secretion slight.	Secretion profuse and purulent.	Secretion little or none.
Slightly or not at all painful.	Generally painful.	Tingling and itching rather than painful.
As a rule only occurs once in any patient.	May reoccur in same patient.	Apt to reoccur.
Buboes are painless and seldom suppurate.	Buboes are painful, and usually suppurate.	Lymphatics seldom involved.

Authorities differ as to when syphilis is cured. Periods of 3, 4, and 5 years since the appearance of the chancre, and during which time the patient has been under active treatment, have been suggested. In addition, the patient must have shown no symptoms for at least a year, and for a year should have taken no treatment and still show no symptoms. At the present time there is a tendency to rely on the Wassermann reaction; this should prove negative on repeated occasions, during a period of a year or more when no treatment is being followed.

9. The first thing is to find out the cause of the high blood-pressure. This may be: Arteriosclerosis, nephritis, cerebral disease, or toxins (generally found in patients who indulge in high living, sedentary occupations, tobacco, alcohol, or who suffer from intestinal putrefaction). Then, if possible, the cause must be removed, and the patient's mode of life must be modified; alcohol and tobacco should be forbidden, overwork and excitement must be avoided, diseases must be properly treated; proper hygiene, diet, and rest are indicated; drugs (such as nitroglycerin, amyl nitrite, and vasodilators in general) must only be used when there is a distinct indication for them.

10. *Acute anterior poliomyelitis.* The early signs are

fever, malaise, chilliness, tonsillitis, coryza, diarrhea, convulsions, profuse sweating, rigidity of head, neck, and limbs, pain in neck and back, or there may be no early signs. "Except in epidemics the diagnosis is not possible before the appearance of paralysis. In *multiple neuritis* the paralysis develops more gradually, is more marked in the distal than in the proximal parts of the limbs and is symmetrical, and the sensory disturbances are more lasting. *Myelitis* may be distinguished by the presence of anesthesia, paralysis of the bladder and rectum, and the tendency to bedsores. The early occurrence of flaccid paralysis and the absence of cocci in the cerebrospinal fluid will distinguish the meningitic type from *epidemic cerebrospinal meningitis*. The *cerebral paralyses of childhood* are spastic, attended by exaggerated reflexes, and not followed by rapid wasting. *Treatment:* During the acute stage the patient should be isolated and confined to bed. Mild laxatives and febrifuges may be used with some advantage. Hexamethylenamine (2 or 3 grains every two hours during the acute stage) has been recommended by Dana and others for the purpose of sterilizing the cerebrospinal fluid. Aspirin or morphine may be necessary for the relief of pain. Warm baths and lumbar puncture are also worthy of trial. The affected limbs should be wrapped in cotton wool. In the course of two or three weeks, if the acute features have entirely subsided, the use of massage and electricity should be begun. The treatment of the latter stages is chiefly surgical, and has for its object the prevention or correction of deformities."—(Stevens' *Practice of Medicine.*)

11. *Grip* is caused by the *bacillus influenzæ* of Pfeiffer; contagion is conveyed by the moist secretions of the nasal and bronchial mucous membranes. The winter season predisposes to the disease. *Treatment* consists of rest in bed; the pain may be relieved by phenacetin or sodium salicylate; the fever may be reliquor ammonii acetatis or Dover's powder may be duced by quinine or aconite; the diet must be regulated; given; tonics may be required, particularly if there are indications of heart failure.

12. *Tarry stools* may denote: Gastric hemorrhage (from ulcer or cancer), ulcer of the intestines, portal obstruction, hepatic cirrhosis, cancer of liver, or purpura hæmorrhagica.

Clay-colored stools may denote: Obstruction to the flow of bile, or deficient formation of bile; calculus in the bile ducts, tumor or movable kidney pressing on the

bile ducts, cancer of the liver, chronic lead poisoning, acute yellow atrophy of the liver.

Greenish, frothy stools may denote: Infantile diarrhea or enteritis.

Hard, lumpy stools may denote: Constipation, cancer of the rectum, gastric dilatation, excessive use of opium.

OBSTETRICS AND GYNECOLOGY.

1. *Syphilitic ulcer of the cervix* is usually round and smooth, with a glistening, dry floor, and bleeds easily when touched; the edges are thick and sloping, and it heals rapidly. As a rule there is very little secretion and little or no inflammatory reaction in the surrounding tissues.—(From Thompson's *Syphilis*.)

2. *Stenosis of the cervix* may be congenital or acquired. The latter may be due to uterine displacements, inflammations of the cervix, contraction after labor, or to operations such as amputation or the frequent application of strong caustics to the cervix. *Treatment* consists in dilating the cervix and curing any local condition that may be present (such as endometritis). Incision is often advisable with the dilatation. For the dilatation, the patient is placed in the lithotomy position and anesthetized; the cervix is pulled down with a volsella, and the canal enlarged with a series of Hegar's dilators, or a Sims' dilator.

3. "Owing to the present low mortality of cesarean section, the indications for its performance have been considerably extended in recent years. It is now performed under most of the conditions which were previously held to necessitate craniotomy upon the living child, and it will probably in time almost replace symphyseotomy; while, owing to the uncertainty of the survival of the child after induction of premature labor, it is encroaching upon the field of this operation also. As regards maternal risk, it compares unfavorably with induction of premature labor, in which there is practically none; but the chances of the survival of the child in the second degree of pelvic contraction are very much greater by cesarean section than by induction. It must, however, be understood that this operation is only justifiable for moderate degrees of pelvic contraction, when it can be performed with adequate preparation and under favorable surgical conditions. In the case of patients seen for the first time when in labor the alternatives of craniotomy and symphyseotomy will sometimes have to be considered even when the child is living. There is no doubt that it is better to perform craniotomy than to attempt to deliver a child by

cesarean section hurriedly undertaken, with insufficient antiseptic preparations, in insanitary surroundings, or by an operator unaccustomed to the technique of aseptic surgery. And further, it may be wiser to perform craniotomy than cesarean section when repeated unsuccessful attempts have been previously made to deliver through the natural passages; for apart altogether from the possible risk of infection having occurred, the chances of the survival of the child, even if delivered alive by cesarean section, have been necessarily prejudiced by repeated and prolonged attempts to extract it with forceps through a narrow pelvis. Cranial injuries may thus be caused from which the child will almost inevitably die, even if born alive. If there are any positive signs of infection having occurred, such as offensive smell of the liquor amnii, or fever associated with signs of illness or exhaustion on the part of the mother, the child's life should be unhesitatingly sacrificed, cesarean section in such a case being an extremely dangerous operation."—(Eden's *Practical Obstetrics.*)

4. *Cesarean section:* "Fluid extract of ergot, ℥xx, is injected into the thigh muscles just as the anesthesia is begun. The operator assures himself that there is no loop of intestine between the uterus and abdominal wall, beneath the field of incision. Should a coil of intestine be found there, it is pushed above the fundus. An assistant holds the uterus in central position. The skin incision extends one-third above and two-thirds below the level of the umbilicus. It is best made through the right rectus muscle. The external layer of the rectus sheath is divided, the muscular bundles separated with handle of scalpel and the fingers, and the deep layer of the sheath and the peritoneum divided after lifting them with tissue forceps. Bleeding vessels are controlled by gauze sponge, pressure, or held by catch-forceps before opening the peritoneum. A short longitudinal median incision is made in the uterine wall beginning at the fundus, avoiding the membranes if still unbroken. This is extended downward with fingers, scissors, or scalpel to a total length of about six inches. The hand is thrust through the membranes and the child is extracted by the head or the feet, whichever is most accessible. In case of anterior implantation of the placenta, usually the hand may best be passed directly through it. The cord is clamped at two points with catch-forceps, cut between them, and the child is passed to an assistant. The uterus slips out of the abdomen as the child is extracted, and the intestines are kept back with hot sterilized towels placed over the upper

part of the incision. The coverings help also to protect the peritoneum from soiling. The uterus is wrapped in hot moist cloths. As a rule, it is better not to wholly eventrate the uterus. The placenta, if not spontaneously separated, may be peeled off by grasping it with one hand like a sponge. If the cervix is not sufficiently open for drainage, a large rubber tube or gauze strip is passed down through it and withdrawn from below. Irrigating or mopping the uterine cavity is unnecessary. Asepsis is promoted by leaving it as nearly as possible untouched. The peritoneum is sponged dry with the least possible friction or handling. The uterine wound is closed with deep No. 2 chromated catgut sutures at intervals of about 1/3 inch. They are given a wide sweep laterally through the muscular wall, falling short of the decidua. The peritoneal coat of the uterus is closed with a No. 1 continuous plain catgut suture, forming a welt over the deep suture line. The hemorrhage is inconsiderable and usually ceases with the introduction of the first sutures—a hypodermic of ergot should be given before beginning the operation, and one of ergotole and pituitrin on the delivery of the child. Retraction of the uterus is ensured by manipulating it, if necessary, through a hot towel, or by faradism. When there has been much blood lost, a quart or two of warm sterilized 0.9 per cent. salt solution may be left in the peritoneum. The parietal peritoneum is closed with a plain running No. 0 catgut suture. Interrupted silkworm-gut sutures are then passed at intervals of about ¾ inch, through all but the peritoneum, from within outward. The fascia is brought together with interrupted No. 2 plain catgut sutures, or with a continuous suture. The silkworm-gut sutures are now tied. The abdomen is cleansed, and the wound covered with a dressing of several thicknesses of dry sterile cheesecloth; over this is placed a thick compress of sterile absorbent cotton. The dressings are secured with strips of zinc oxide adhesive plaster, and held in place by a Scultetus binder."—(Polak's *Obstetrics.*)

5. *Structures divided in complete laceration of the perineum:* Skin, fascia, connective tissue, constrictor vaginæ, sphincter ani, transversus perinei, and levator ani muscles, and the anterior wall of the rectum.

Operation for lacerated perineum: "The labia are seized with Allis' forceps at the level of the lowest carunculæ myrtiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis forceps and the guide stitch in opposite directions outward and down-

ward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to tier suture of chromic gut. two half hitches being taken the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transversus perinei and bulbocavernosus muscles are brought together by silkworm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal stitches are knotted; they are removed on the twelfth day."—(Hirst's *Obstetrics.*)

6. *Relation of non-specific cystitis to gynecology:* Many of the causes of non-specific cystitis are closely connected with the pelvic organs. Thus congestion of the bladder may be related to diseases of the uterus, ovaries or Fallopian tubes; or to pelvic and abdominal tumors which obstruct the circulation; or to pregnancy, menstruation, and the puerperium. Another source of cystitis is retention of urine, which may be due to cystocele and to uterine displacements.

Relation of constipation to gynecology: "Constipation is an important factor in the causation of many diseases and symptoms peculiar to women. An overloaded bowel mechanically interferes with the pelvic circulation and tends to produce congestion of the uterus and its appendages. As a result, misplacements of the uterus occur, followed by functional and organic disorders, which give rise to dysmenorrhea, menorrhagia, metrorrhagia, sterility, endometritis, etc. Slow toxemia frequently results from the absorption of the fecal matters by the blood in obstinate cases of constipation." (Ashton's *Gynecology.*)

7. The cause should be removed if possible; or failing that, should receive appropriate treatment. If due to a pessary, the latter should be removed. The vagina must be kept as clean as possible, and antiseptic douches should be taken two or three times a day. An astringent such as nitrate of silver, or copper sulphate, or protargol may be applied, and a tampon inserted for from twelve to twenty-four hours.

8. *The fetal circulation:* "The arterial blood coming from the placenta to the fetus travels along the um-

bilical vein to the liver. After giving off several branches to the left lobe it divides into two streams, the larger joining the portal vein and thus entering the liver, the smaller passing directly into the inferior vena cava through the *ductus venosus*. In the inferior vena cava the blood carried by the hepatic veins and ductus venosus mixes with the blood which has circulated through the lower extremities. On entering the right auricle the blood of the inferior vena cava is directed by the Eustachian valve, through the foramen ovale into the left auricle, and from thence into the left ventricle. The left ventricle forces it into the aorta, and it is then distributed to the head and upper extremities, a small quantity only passing into the descending aorta. The blood which has circulated through the head and upper extremities returns to the heart along the superior vena cava, the blood then passing into the right ventricle and pulmonary artery. A small part of the blood in the pulmonary artery is conveyed to the lungs, but the major part passes through the ductus arteriosus into the aorta at the commencement of the descending portion. This blood is distrbuted to the lower extremities, a certain portion of it entering the hypogastric arteries and being conveyed to the placenta."—(Ashby's *Physiology*.)

The changes occurring in the circulation at birth are: The hypogastric arteries become obliterated, the umbilical vein becomes impervious, the foramen ovale closes, the Eustachian valve atrophies, the ductus arteriosus and ductus venosus become impervious and shrivel up.

A *blue-baby* is one suffering from congenital cyanosis; this is a form of asphyxia neonatorum in which there is an accumulation of carbon dioxide in the blood, but the circulation still continues and the reflexes are preserved.

9. *Mastitis:* Prophylactic measures consist in not touching the breasts (by doctor or nurse or patient) without thoroughly clean hands; by washing and drying the nipple before and after nursing, and by proper attention to hygienic conditions before labor, and the nipple and breasts being preserved from pressure.

Ophthalmia neonatorum: Prophylaxis. Immediately after birth the eyelids of the newborn child should be washed with clean warm water and onto the cornea of each eye should be dropped one or two drops of a 1 or 2 per cent. solution of nitrate of silver. This procedure will prevent ophthalmia neonatorum in doubtful cases; it will do no harm in innocent cases; and it is the first stage in treatment if gonorrheal infection is present.

Puerperal infection: Prophylaxis. The most careful aseptic and antiseptic precautions on the part of all concerned—physician, nurse, and patient; and making no more examinations than are absolutely necessary.

Postpartum hemorrhage. Preventive treatment. "This must be addressed to the uterine retraction. The uterus should be watched, with the hand continuously on the abdomen, from the birth of the child and for at least a half hour after the placenta is delivered. Care should be taken that no fragment of placenta is left in the uterus. Friction may be used if required to provoke normal contractions. Too early resort to Credé's manipulation may cause imperfect separation of the placenta, and produce hemorrhage from partial separation of the placenta. In persistent inertia, ergotole, ℥ss, and pituitrin (1-3 decigrams) injected hypodermically, and repeated, p. r. n., is a valuable prophylactic. It is often indicated after chloroform anesthesia, and in all conditions which predispose to hemorrhage. It is a wise precaution to give ergot on birth of the head when there is reason to fear postpartum hemorrhage. It is the abuse, not the proper use, of ergot that has brought it into disrepute in certain quarters."—(Polak's *Manual of Obstetrics.*)

10. *Differential diagnosis.—Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Retained menses: Absence of other signs of pregnancy, cramp-like pains about once a month; the condition may be of longer duration than an early pregnancy, and the cause of the retained menses is generally demonstrable.

11. *The use of ergot:* "The routine administration of ergot after the birth of the child is not to be recommended. No remedy should be administered in any condition unless there is a direct indication for its use. In primiparæ and strong multiparæ the uterine contraction should be strong enough to effectually empty the cavity of the womb and obliterate the venous channels. In such cases the ergot is useless or even dangerous in that it may cause an irregular hour-glass contraction of the uterus, with retention of clots, membranes, and débris, and at the same time has a retarding influence upon the development of the milk. Then again, if given before the birth of the child, serious or even fatal

asphyxia may result from the tetanic contractions induced by the drug. The danger of laceration of the cervix, perineum, and vaginal wall as well as of rupture of the uterus is increased by the use of ergot. There is, however, a suitable class of cases in which the use of ergot is indicated in appropriate doses. This includes all forms of uterine exhaustion and inertia during the late second and third stage and after delivery has been completed."—(Dorland's *Obstetrics.*)

Pituitrin may be given, cautiously, in cases of uterine inertia; the dose is 1 cc. by intramuscular injection. As it may cause very severe uterine contractions it should not be given unless the os is dilated and there is no obstruction to delivery. And see above, Question 9, *Postpartum hemorrhage.*

Quinine is used to promote utérine contractions, in uterine inertia, also to alleviate after-pains.

Scopolamine has been used with morphine or narcophine, in the most advertised "twilight-sleep." It is used by intramuscular injection, and is put up in ampoules containing one cubic centimeter, = gr. 1/200 of scopolamine. In properly selected cases and with proper environment, it is of service.

Lobelia is said to be of use in case of rigidity of the os uteri when the latter is thick and unyielding.

Gelsemium has no recognized value in obstetrics.

12. In *examining a primipara*, the physician should satisfy himself as to the existence of pregnancy, then the duration of the pregnancy and the probable date of labor should be determined, then the viability of the fetus and the presentation should be ascertained, the condition of the genital organs and the mammary glands is then ascertained, and measurements of the pelvis are to be made.

An examination should be made about six weeks after delivery in order to ascertain: The condition of the pelvic floor, and perineum, the position of the fundus, the vaginal discharge, the degree of mobility of the uterus, the condition of the breasts and nipples, and the general condition of the patient.

SURGERY.

1. *Treatment of recent scalp wounds.*—"To ensure asepsis, the hair should be shaved from the area around the wound, and the part then thoroughly purified. Gross dirt ground into the edges of lacerated wounds is best removed by paring with scissors. Undermined flaps must be further opened up and drained by counter-openings if necessary. When there is reason to suspect their presence, foreign bodies should be carefully sought

for. Bleeding should be arrested by forcipressure or by ligature; when the vessels cannot be caught with forceps, the hemorrhage may be controlled by passing a needle threaded with catgut through the tissues of the scalp so as to include the bleeding vessels. The wound is stitched with horse hair or sterilized silk and, except in very small and superficial wounds, it is best to allow for drainage. The most common *complications* are those due to bacterial infection, which not only aggravates the local condition, but is apt to lead to spreading cellulitis, osteomyelitis, meningitis, or to inflammation of the intracranial venous sinuses. These dangerous sequelæ are liable to follow infection of any scalp wound, but more especially such as implicate the subaponeurotic area or the pericranium. In the integument, a small localized abscess, attended with pain and edema of surrounding parts, may form. Pus forming under the aponeurosis is liable to spread widely, pointing above the eyebrows, in the occipital region, or in the line of the zygoma. Suppuration under the pericranium tends to be limited by the inter-sutural attachments of the membrane. Necrosis of the outer table, or even of the whole thickness of the skull, may follow, although it is by no means uncommon for large denuded areas of bone to retain their vitality."—(Thomson and Miles' *Surgery*.)

2. The following factors have been suggested in the etiology of post-operative thrombosis: (1) Disturbances of the venous circulation which might exist before the operation and would predispose to thrombosis, such as heart lesions, varicose veins, exhaustion, prolonged decubitus, and pressure of abdominal tumors. (2) Conditions attending the operation, such as unavoidable chilling and exposure of the contents of the abdominal cavity and possibly traumatism to the vessel walls. (3) The injurious effects upon the heart muscle of the anesthetic. (4) The topographic relations of the vessels. (From Keen's *Surgery*.) *Prevention* of the condition depends on avoidance of the etiological factors. subjecting the patient to the minimum of trauma, and carefully ligating the bloodvessels.

3. *The treatment of ileus* in acute cases consists in the withholding of food, irrigation of the stomach and colon, and the administration of cracked ice by the mouth and opium hypodermically. Exploratory incision may be performed. In chronic obstruction the diet should be restricted and measures should be taken to remove the obstruction. Impacted feces may require the use of the scoop or similar instrument. Impacted

gallstones may require cholecystotomy. Internal strangulation should be relieved by early operation. In volvulus occasionally the intestine may be untwisted by insufflations of air or hydrogen or a large enema. Intussusception is treated similarly, but operation may be required in both conditions. Colotomy or enterotomy is necessary in case of stricture and contractions.

CLASSIFICATION OF ILEUS.

STRANGULATION.	INTUSSUSCEPTION.	TWISTS (VOLVULUS).
Subjective Symptoms.	*Subjective Symptoms.*	*Subjective Symptoms.*
1. Generally occurs after age of 20.	1. Most frequent in childhood.	1. Most frequent after age of 30.
2. Pain localized, rapid collapse.	2. Constant tenesmus.	2. Pain diffuse.
3. Pain intense, paroxysmal in character.	3. Pain develops suddenly and is continuous.	3. Pain paroxysmal; recurs less often than in strangulation.
4. Constipation complete.	4. Frequent diarrhea, passage of bloody mucous.	4. Constipation complete.
Objective Symptoms.	*Objective Symptoms.*	*Objective Symptoms.*
1. Temperature often subnormal.	1. Temperature normal or subnormal.	1. Temperature slightly elevated.
2. Pulse very weak.	2. Same as in strangulation.	2. Same as in strangulation.
3. Stercoraceous vomiting comes on early.	3. Same as in strangulation.	3. Same as in strangulation.
4. Location in small intestine.	4. Localization in small intestine; bowel frequently protrudes at rectum.	4. Location, small intestine; abdomen often protrudes, in certain areas, giving dullness on percussion.

4. *Delayed union in fracture is caused by:* Ill health, want of approximation of the end of the bone, want of blood supply in the bone, defective innervation of the bone, disease of the bone, lack of rest, and immobility.

Treatment is given by DaCosta as follows:

"When delayed union exists, seek for a cause and remove it, treating constitutionally if required, and thoroughly immobilizing the parts by plaster. Orthopedic splints may be of value. Use of the limb while splinted, percussion over the fracture, and rubbing the fragments together, thus in each case producing irritation, have all been recommended. Blistering the skin with iodine or firing it has been employed. If the case be very long delayed, forcibly separate the fragments and put up in plaster as a fresh break. If these means fail, irritate by subcutaneous drilling or scraping, or, better, by laying open the parts and then drilling and scraping at many places."

5. *Indications for paracentesis of the membrana tympani:* To evacuate pus in the tympanum (and so to relieve pain, limit the infection, shorten the disease, and prevent complications); for enlarging perforations which are too small to allow adequate drainage; it is employed also in certain catarrhal and inflammatory conditions of the ear.

The parts are to be sterilized, an anesthetic (local or general) given; and the incision is then made with a slender, sharp-pointed knife. A speculum and adequate illumination will be necessary. The particular quadrant which should be incised depends upon the condition calling for the operation. The incision should be made sufficiently long; a mere puncture is not sufficient. If possible the incision should be so placed that the opening will extend from near the floor of the canal upward and through the bulging portion of the membrane. The surgeon should avoid touching the auditory ossicles.

6. *Backward dislocation of the thumb at the metacarpophalangeal joint* "is usually produced by extreme dorsiflexion of the thumb, whereby the palmar or glenoid and the lateral ligaments are torn from their metacarpal attachments, the phalanx carrying with it the glenoid ligament and sesamoid bones. The head of the metacarpal passes forward between the two heads of the flexor brevis pollicis, and the tendon of the long flexor slips to the ulnar side. The phalanx passes on to the dorsum of the metacarpal, where it is held erect by the tension of the abductor and adductor muscles. The attitude of the thumb is characteristic. The metacarpal is adducted, its head forming a marked promi-

nence on the front of the thenar eminence, and the phalanges are displaced backwards, the proximal being dorsiflexed and the distal flexed toward the palm. Reduction is to be effected by flexing and abducting the metacarpal while the phalanx is hyperextended and pushed down towards the joint and levered over the head of the metacarpal. When this manipulation fails, the glenoid ligament should be divided longitudinally through a puncture made with a tenotomy knife on the dorsal aspect of the joint, so as to separate the sesamoid bones and permit the passage of the head between them."—(Thomson and Miles' *Surgery.*)

7. "After a perforating wound of the cornea the eye should be thoroughly disinfected, the iris, if prolapsed, replaced if possible, and eserine or atropine instilled, according to the situation of the injury. If replacement is not possible, the prolapsed portion should be seized with iris forceps and excised. In either event the subsequent treatment requires rest, disinfection of the conjunctival cul-de-sac, and a carefully applied antiseptic compressing bandage. Care must be taken to ascertain whether a foreign body has lodged within the anterior chamber or within the deeper portion of the globe. *X*-ray examination may be necessary."—(De Schweinitz's *Diseases of the Eye.*)

8. *Hydronephrosis.*—"The pelvis and calyces are distended with urine owing to some obstruction. Congenital stenosis at the junction of the ureter and pelvis may cause unilateral hydronephrosis; a congenital impervious condition of the urethra causes bilateral hydronephrosis. Acquired forms are due to (1) blockage of the urinary passages by stones, pasasites, stricture; (2) kinking of the ureter due to a movable kidney; (3) pressure of tumors or cicatrices on the ureter. A sudden and absolute block leads to suppression of urine. Hydronephrosis results from intermittent or incomplete obstruction, whether the urethra or the ureter is affected. The pelvis and calyces become dilated, and later the cortex and pyramids become thinned and expanded. Interstitial inflammation accompanies this, and at first the urine is abundant and of low specific gravity. In the later stages the secreting substance is entirely atrophied. At any stage septic processes may convert the condition into pyonephrosis. The *symptoms* may be entirely absent, only a painless enlargement of the kidney being noticed. If both are affected, there is at first an abundance of low specific gravity urine, which later becomes scanty, uræmia following. If one kidney only is affected, the urine remains normal. Pain, vomiting,

and increased frequency of micturition may be present. The size of the tumors varies from time to time, diminution being accompanied by an increased flow of urine. Sepsis may produce pyonephrosis at any time. *Treatment.*—The cause should be removed, if possible. Unilateral hydronephrosis usually needs an exploratory incision, and if the block cannot be removed nephrectomy is necessary."—(*Aids to Surgery.*)

9. *Retropharyngeal abscess* "may be acute or chronic, and is most frequent in children. Acute abscess may be caused by foreign bodies, or by infection of the lymph glands in this region, which drain the nose and nasopharynx. The chronic form is usually the result of caries of the spine or base of the skull, and is not associated with the fever and inflammatory phenomena characteristic of the former. In either case the posterior wall of the pharynx bulges forward, exhibits fluctuation, and may interfere with deglutition and respiration. If unopened, the abscess will break into the pharynx, point externally in the neck, or gravitate into the posterior mediastinum. The treatment is evacuation through the mouth in acute cases, and through the neck in chronic cases, as in the latter secondary infection should be prevented. When the abscess is to be opened through the mouth, the head should hang over the edge of the table, in order to prevent entrance of pus into the air passages, and the abscess opened with a knife, the edge of which is covered with adhesive plaster to near the point. Anesthesia is dangerous. When the abscess is opened through the neck, an incision is made along the posterior border of the sternomastoid from the apex of the mastoid downwards, unless the abscess points in some other region. The finger or a pair of forceps is passed along the anterior surface of the bodies of the vertebræ and a drainage tube inserted."—(Stewart's *Surgery.*)

10. "The presence of a tumor, dimpling of the skin, retraction of the nipple, with cachexia, enlarged lymphatic glands in axilla or above or below the clavicle, and microscopical examination of an excised piece of the tumor all aid in the diagnosis of malignant growth of the breast. *Treatment* should be early and thorough. However small the tumor may be, the entire breast and its corresponding lymphatic area, as high as the apex of the axilla, should be removed; for, once infection of the lymphatic spaces has occurred, the whole lymphatic area must be looked upon as infected. Successful operations depend upon a knowledge of the *lymphatics* and *extent* of the breast. The lymphatics

begin in plexuses around the acini, which converge to vessels running along with the ducts and end in a subareolar plexus. From this three or four main lymphatic trunks run to the axillary glands. In addition, lymphatics run along the suspensory ligaments to the skin all over the prominence of the breast from the interacinous plexuses. Also vessels leave the deep part of the breast to join lymphatic plexuses in the pectoral fascia. The plexuses in the fascia run to the axilla, and also communicate with those in the pectoralis major. Lymphatic vessels pass into the mediastinum, and also communicate with those of the opposite breast and axilla. The extent of the breast is much greater than the prominence would lead one to believe. It extends almost to the clavicle, just to the edge of the sternum, down to the seventh rib, and out to the mid-axillary line. The points, then, in operating are that the whole breast, the skin over the prominence, the pectoralis major muscle (except the clavicular portion), the fat, fascia, lymphatic vessels and glands of the axilla, must be removed, and in one piece, for if cut across at any part there is danger of strewing cancer cells on the wound and so infecting it with growth. Removal or division of the pectoralis minor facilitates the cleaning of the axilla."—(*Aids to Surgery.*)

11. "FRACTURE OF THE BASE OF THE SKULL. *Causes:* Violence applied to the cranial convexity produces fracture by irradiation or by bursting (in this latter form, which is the more common, the vault is compressed, and the base bulges beyond its limits of elasticity and gives way); direct injury is an unusual cause; the impact of the vertebral column against the occipital condyles produces fractures around the foramen magnum in some cases of falls on the feet or nates. The *signs* are those of (1) injury to the brain, (2) escape of cranial contents, (3) injury of cranial nerves. (1) *Injury to the brain* may be of the nature of concussion, compression, or laceration. (2) *Escape of cranial contents*, which may be blood, cerebrospinal fluid, or rarely brain itself. 1. *Hemorrhage* manifests itself in various situations, according to the position of the fracture. In the *anterior fossa* the bleeding may be from the nose or into the orbit, or may pass back into the pharynx, be swallowed, and subsequently vomited. The eye may be pushed forward and pulsate if the cavernous sinus be ruptured. In the *middle fossa* blood usually runs from the ears; but slight bleeding from the ear may be caused by minor injuries, such as rupture of the membrana tympani, tearing of the lining of the auditory canal,

and fracture of the tympanic bone. In the *posterior fossa* a hematoma may form behind the mastoid process. 2. The escape of *cerebrospinal fluid* is a certain sign that a fracture communicates with the subdural space. It may appear in the same situations as hemorrhage, but is usually found escaping from the ear, owing to fracture of the petrous bone. The fluid is limpid, specific gravity 1005, with no albumin, but containing pyrocatechin, which gives the same reaction as sugar with Fehling's solution. The amount which escapes may be small or very large, but as a rule it soon ceases. (3) *Injuries to the cranial nerves* vary according to the site of fracture. That most commonly involved is the facial, in the aqueductus Fallopii, and the paralysis may come on immediately from rupture, or after two or three weeks from the pressure of callus."—(From *Aids to Surgery.*)

12. FLAT-FOOT "is most common in adolescents, and is primarily due to giving way of the arch of the foot from inability to support the weight of the body. It affects those whose occupation entails prolonged standing, especially if there is any deterioration of the general health. It is also met with in rickets, together with genu valgum. Acute flatfoot is due to gonorrheal inflammation affecting the inferior calcaneo-scaphoid ligament. *Pathological Changes.*—The structures which support the arch of the foot—viz., the inferior calcaneo-scaphoid ligament, the tendon and insertions of the tibialis posticus, the plantar ligaments and fascia—become stretched, and allow the head of the astragalus to be displaced downwards, obliterating the arch. In bad cases the anterior part of the foot becomes abducted, the scaphoid being partially dislocated outwards from the head of the astragalus. The sole is flat, the inner border of the foot is convex, severe pain is felt on walking, and the gait is shuffling. The pain is either in the arch or about the heads of the metatarsal bones. *Treatment.*—In the early stages, when pain with only slight flattening of the arch is present, rest and massage of the calf muscles, with tiptoe exercises twice a day. Where there is deformity, but the natural arch can be restored by manipulation, exercises should be practised, and in the intervals a support, such as Whitman's steel instep support, worn, or Golding Bird's webbing sling for the arch. In worse cases, where there is secondary shortening of the ligaments on the outer side of the foot and of the peronei, the deformity must be forcibly rectified during anesthesia, and the foot kept in plaster for several weeks. In the worst cases, which cannot be

wrenched into position, a wedge must be removed, with its base to the inner side of the foot, either from the neck of the astragalus or from the tarsus, irrespective of joints."—(*Aids to Surgery.*)

HYGIENE AND SANITATION.

1. "In selecting the sites for camps or homes of soldiers, consideration must be had as to whether these are to be temporary or permanent, and as to whether the men are to live in tents or barracks. In any case, there should be sufficient space allotted to each command; there should be no interference with the free circulation of air, and the soil should be dry, porous, and readily drained. The ground water especially should not be too near the surface. Camps should not be located, except in event of grave military necessity, on ground that has been recently occupied by other troops; nor should they be on clay soils, in ravines or valleys where they will receive the drainage from higher ground or other camps, nor near marshes or the marshy banks of rivers, nor where they will receive the winds from malarial districts. Thought should also be given to the source and abundance of the water supply and its relation to the natural course of drainage from the camp. If tents are to be used, these must be such as to afford both thorough protection and good ventilation. They should not be too crowded, either as regards the number of occupants or the location of the tents one to another. If the camp is of extended duration, the tents should be floored, or, at least, the men should not sleep on the ground. A trench should also be dug about each tent to prevent flooding by rains, and from time to time the tents should be moved about, as it is well known that tents occupying the same ground for a length of time become unhealthy. Camp kitchens, stables, sinks, latrines, etc., should be as far from the sleeping tents as reasonable convenience permits, and to the leeward of prevailing winds. All camps should be regularly and carefully policed, and the fact that a camp expects to change its position does not justify neglect of proper policing of the ground occupied."—(Egbert's *Hygiene and Sanitation.*)

2. *Absolute humidity* is the actual amount of moisture in a given quantity of air. *Relative humidity* is the percentage of moisture present in the air, complete saturation being taken as 100.

Respiratory diseases, with tuberculosis, influenza, and rheumatic conditions are most prevalent in a humid atmosphere.

3. *To eradicate scurvy:* Abundance of fresh air and sunlight, with an ample supply of fresh vegetables and fruit, milk, eggs, meat, and fish will go far to eradicate the disease. The diet must not be monotonous; canned foods should be avoided. Orange juice or lime juice may be beneficial.

4. *Sewer gas* is a mixture of a number of gases, such as carbon dioxide, ammonia, hydrogen sulphide, and certain organic matters the result of animal and vegetable decomposition. When large quantities are inhaled there may result vomiting, headache, prostration, purging, loss of appetite, anemia, and general impairment of health.

5. "Ptomaines are chiefly the cause of disease when they are taken in with food in which they have been produced by bacterial decomposition. Besides this food poisoning, it is also possible that ptomaines may be formed by putrefaction within the gastrointestinal tract. Another possible source of ptomaines is furnished by decomposing tissues in gangrene. It is doubtful if ptomaines are produced in sufficient quantities by pathogenic bacteria infecting living tissue to be of any importance. Food poisoning is by no means uncommon, but it is not always due to ptomaines; it may be the result of poisonous materials contained abnormally in the food, that are not ptomaines, *e.g.* ergotism; or it may be due to an infection of the animal from which the meat came with pathogenic organisms, particularly the *bacillus enteritidis* and other bacteria related to the colon-typhoid group; or in other ways food ordinarily wholesome may become poisonous. The commonest sources of ptomaine poisoning are imperfectly preserved canned meats, sausages, decomposing fish, cheese, ice cream, and milk."—(Wells' *Chemical Pathology.*)

6. *Malaria* is conveyed by the bite of an anopheles mosquito which is itself infected with the plasmodium malariæ.

Bubonic plague is conveyed by the bite of a flea from a rodent (rat, etc.) which is infected with the disease.

Diphtheria is conveyed by direct contact, by carriers, by dust, by droplets of saliva or mucous secretion from mouth and nose, and by flies.

Syphilis is conveyed by direct contact with the chancre and the secondary lesions.

Typhoid fever is conveyed by the medium of food, fingers, flies, direct contact, carriers, water.

7. To prevent the spread of typhoid fever: Flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the

sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over. Further, each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food.

8. Immigrants are inspected for idiocy, imbecility, feeblemindedness, epilepsy, insanity, tuberculosis, loathsome and contagious diseases, including favus, ringworm of scalp, sycosis barbæ, actinomycosis, blastomycosis, frambesia, mycetoma, leprosy, and venereal diseases such as demonstrable syphilis in active communicable stage, gonorrhea, and soft chancre; trachoma filariasis, uncinariasis, amebic infection; hernia, state of permanently defective nutrition, chronic arthritis, malignant new growths, cutaneous affections, eruptive fevers, tuberculous affections. The inspection is conducted by experienced men; the immigrants are drawn up in line, and pass one by one before the inspector, who examines them rapidly from the feet up; the facies, gait, attitude, etc., are also noted. There are often three or four inspectors, and any one of them who notices anything suspicious puts a chalk mark on the clothes of the suspect, and later on those with such marks are submitted to further and more searching examination.

9. "The original view that tuberculosis in a majority of cases is hereditary and that children of tuberculous ancestry were foredoomed to an early death from the disease is untenable in light of the facts regarding the Koch bacillus. A fair statement of the matter is as follows: Tuberculosis cannot exist without the influence of bacilli. For the bacillus to be transmitted by inheritance it must either pass to the embryo through the spermatozoon, the ovum, or from the maternal blood through the placental vessels. Tuberculosis of the generative organs is not rare, but the chance of even a single bacillus entering a spermatozoon or an ovum and occupying so large a part of such cell as its substance would necessarily do without destruction of one organism or the other seems incredible. As for blood transmission of the bacillus through maternal vessels, while its possibility must be admitted to account for

the few authentic cases of congenital tuberculosis reported, the presence of bacilli in the blood of the most advanced cases of tuberculosis is extremely rare excepting during the temporary accident of the perforation of a tuberculous mass into a bloodvessel as a forerunner of miliary tuberculosis. How, then, are the early cases of socalled hereditary tuberculosis to be explained? Of these not more than twenty have been described as actually congenital (Hahn). The remainder have all appeared at a considerable interval after birth. The nursing infant, weakened by the inheritance of poor vitality, is kept close beneath the bedclothing of a tuberculous mother, and cannot avoid inhaling bacilli which have escaped with her expectoration, transferred, perhaps, from handkerchief to sheet, and soon dried in the warmth of the bed, or perhaps the same handkerchief is used for the mother's sputum and the child's nose. The older infant is kissed by a tuberculous member of the family, bacilli from whose sputum can easily be found upon the beard or face, or it is allowed to crawl about upon a dusty, germ-impregnated carpet. The disease thus acquired and developed thus early in the ill-conditioned weakling makes rapid strides, and is easily attributed in error to 'heredity.' For 'heredity' in this sense should be substituted criminal negligence in matters hygienic."—(Thompson's *Practical Medicine.*)

10. *To eradicate hookworm:* All drinking water should be boiled; the hands should be washed before eating; shoes should be worn and none should go barefooted; proper toilet facilities should be provided, and people should not be allowed to scatter fecal matter around; mines should be disinfected with chloride of lime.

11. *Prophylaxis of filth diseases:* This includes general cleanliness of person, clothes, food, habitation, and habits; pure air, proper ventilation, sufficient sunlight, adequate warmth; preventive inoculation where possible; avoidance of those suffering from disease; disinfection and isolation to be practised where necessary.

12. All receptacles should be scalded with boiling water. Milkers should wipe the teats and also wash their own hands before milking. Stables should be kept scrupulously clean and freely ventilated. All accidental contamination should cause the rejection of that particular pail of milk. The milk should at once be strained and cooled to about 40° F., and kept at not above that temperature until delivery to the customer. Delivery should be as prompt as possible. Sale of "loose" milk should be prohibited, and adulteration of milk should be penalized.

COLORADO.

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF COLORADO.

ANATOMY.

1. Describe the bony points in connection with the elbow joint.
2. Give the muscular attachments around the shoulder.
3. Describe the anterior and posterior fontanelles in the new born child.
4. Describe the sternomastoid muscle, in what way is it important?
5. Describe the clavicle.
6. Draw a diagram illustrating the area of hepatic dullness.
7. Describe the acetabulum.
8. Explain the formation and location of the superficial and deep palmar arches.
9. Draw a diagram illustrating the areas into which the abdomen is divided, naming the regions.
10. Describe the inguinal canal.
11. What do you understand by the saphenous opening, discuss its importance.
12. Give gross anatomy of the kidney.

Answer any ten questions.

PHYSIOLOGY.

1. Follow a molecule of fat through the process of its digestion and assimilation, and tell what becomes of it in the body.
2. Name and describe the function of the several component parts of the blood.
3. Tell how urine is secreted, and mention its physiological constituents.
4. What do you understand by association areas in the brain?
5. Describe the physiology of menstruation.
6. Give a detailed description of how we hear.
7. What are the physiological functions of spleen, the pancreas, and the thyroid gland?
8. What physiological factors are concerned in the regulation of blood pressure.
9. Name five enzymes and give action of each.
10. What elements are essential to impregnation?

CHEMISTRY.

1. Define (*a*) Inorganic chemistry; (*b*) Organic chemistry.
2. Define qualitative and quantitative analysis.

3. Define valence and give examples.
4. What is an alcohol? Its chief forms and their sources?
5. What are carbohydrates, and into what three groups are these compounds usually divided?
6. Give chemical constituents of normal urine.
7. Give qualitative and quantitative tests for albuminuria, with its chemical significance.
8. Give qualitative and quantitative tests for sugar in the urine with its chemical significance.
9. To what is the color of the blood due, and in what form?
10. Define with some detail the chemistry of respiration.

PATHOLOGY.

1. Discuss aneurysm.
2. Give the pathology of gastric ulcer.
3. Describe the tubercle bacillus.
4. Give the pathology associated with jaundice.
5. Define anaphylaxis.
6. Describe leucocytosis and its significance.
7. What is pellagra?
8. Name the varieties of vesical calculi.
9. Give the technique of the Gram stain.
10. What conditions are accompanied by eosinophilia?

SYMPTOMATOLOGY.

1. Give the causes and symptoms (including the character of the urine) of acute nephritis.
2. What are the symptoms of rheumatic fever?
3. Describe a case of erysipelas.
4. What are the symptoms and commonest complications of diphtheria?
5. Give the symptoms and signs in a case of incipient pulmonary tuberculosis.
6. Describe a case of croupous pneumonia.
7. If an embolus arises from the saphenous vein where will it lodge, and what symptoms will it cause?
8. If an embolus arises from the mitral valve where may it lodge, and what symptoms will it cause?
9. Describe a case of acute poliomyelitis.
10. Discuss the anomalies of rate and rhythm of the heart beat.

OBSTETRICS.

1. Give the successive changes that take place in the ovum after fecundation and during its passage to the uterus.
2. Name and describe the five movements in the mechanism of an L. O. A.

3. Give the differential diagnosis between placenta prævia and abruptio placentæ.
4. Give the causes, diagnosis, and treatment of uterine inertia.
5. Give the indications and conditions requiring cesarean section and describe Sanger's modification.
6. Name indications, conditions and give technique in the use of low forceps.
7. Mention the varieties of hemorrhage that may affect the pregnant woman, the parturient woman and the puerperal woman.
8. What is placenta previa, give its causes, varieties, symptoms, and treatment.
9. Give in outline form the manner in which you would go about to make a diagnosis of the position of the child.

TOXICOLOGY.

1. What is a poison? How are they classified?
2. What are the symptoms of opium poisoning?
3. How may carbolic acid poisoning be produced? Give symptoms.
4. Describe bromism and state how it is produced.
5. What symptoms are produced by toxic doses of tartar emetic?
6. Describe forms of poisoning by ergot.
7. Name five common vegetable poisons; give antidotes for one.
8. Describe the symptoms of hydrargyrism.
9. Describe the case of strychnine poisoning.
10. Give symptoms arising from a toxic dose of digitalis.

SURGERY.

1. Discuss disease of the thyroid gland.
2. Discuss disease of the mammary gland.
3. Varieties of intestinal obstruction. Give differential diagnosis.
4. Describe Pott's fracture of the leg.
5. Differential diagnosis of injuries of the shoulder.
6. Name the herniæ of the abdomen. Describe fully three varieties (anatomy).
7. Describe a case of sapremia, giving differential diagnosis.
8. Discuss gastrointestinal hemorrhage.
9. Discuss cerebral hemorrhage.
10. Discuss the following case: A man 30 years of age. On Sunday night at 11 o'clock was taken with severe abdominal pains. He vomits once or twice, and describes the pain as being mostly below the navel.

On examination the abdomen is generally tender. Temperature 100°; pulse 90; respiration 30. Monday noon his temperature is 102.5°; pulse 100. The pain is very severe, and palpation elicits an area of exquisite tenderness to the right of the abdomen above the crest of ilium. A leucocyte count gives 12,500. Discuss the case.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF COLORADO.

ANATOMY.

1. There are three bony points at the elbow: The external condyle of the humerus, the internal condyle of the humerus, and the olecranon process of the ulna. When the forearm is extended these three points are in a straight line; when the forearm is flexed, the olecranon is a little below the line joining the two condyles. The head of the radius can be felt from behind, nearly one inch below the external condyle. The internal condyle is more prominent than the external condyle; the olecranon is nearer to the inner than to the outer condyle.

2. *Muscular attachments around the shoulder:* To the outer end of the clavicle are attached the trapezius and deltoid; to the coracoid process of the scapula, the coracobrachialis and the short head of the biceps; to the acronical process and spine of the scapula, the deltoid and trapezius; to the posterior surface of the scapula, the supraspinatus and infraspinatus; to the supraglenoid tubercle, the long head of the biceps; to the great tuberosity of the humerus, the supraspinatus, infraspinatus and teres minor; to the lesser tuberosity, the subscapularis; to the upper and anterior part of the shaft of the humerus, the latissimus dorsi and teres major.

3. The *anterior fontanelle* is a lozenge-shaped space, formed by lack of ossification in the posterior superior angles of the two halves of the frontal bone and in the anterior superior angles of the parietal bones. It is situated where the coronal suture crosses the sagittal suture.

The *posterior fontanelle* is a triangular depression situated at the point where the sagittal and lambdoidal sutures meet; it is much smaller than the anterior fontanelle.

4. The *sternomastoid muscle* arises by two heads, one from the upper and inner end of the clavicle, the other from the upper border of the sternum; there is a triangular space between these two heads; the fibres from each head pass upwards and backwards and unite, and are inserted into the mastoid process of the temporal bone and the outer part of the superior curved line of the occipital bone. The nerve supply is from the spinal accessory and branches of the cervical plexus. The muscle divides the side of the neck into two triangles, the anterior and posterior; it is an important landmark, especially of the carotid region, since the great vessels of the neck lie beneath its anterior border; it marks the line of incision for several operations.

5. The *clavicle* forms the anterior part of the shoulder girdle; it articulates internally with the first part of the sternum, and externally with the acromion process of the scapula. It is broad and flattened at its outer end, and thick and rounded at the inner end. It consists of a double curve, the outer part is concave forward, the inner part convex forward. The bone has two surfaces, superior and inferior, and two borders, anterior and posterior. On the under surface are the conoid tubercle, a groove for the subclavius, a rough impression for the rhomboid ligament. *Muscles attached to it* are: Deltoid, trapezius, pectoralis major, subclavius, sternomastoid, and sternohyoid. *Ligaments attached to it* are: Interclavicular, rhomboid, conoid, trapezoid, and capsular (of sternoclavicular and acromioclavicular articulations).

6. The upper border of hepatic dullness is found in the mamillary line at the level of the sixth rib, in the midaxillary line at the eighth rib, and in the scapular line at the tenth rib. The lower margin of dullness is situated in the middle line in front, about a hand's breadth below the junction of the gladiolus and ensiform; in the right mamillary line it reaches the costal margin; in the midaxillary it is in the tenth intercostal space; and behind, in the scapular line it blends with the dullness over the right kidney.

7. The *acetabulum* is a deep, hemispherical depression in the os innominatum. It is made up of all three bones comprising the os innominatum, viz.: the ilium, ischium, and pubis. It looks downward, outward, and forward. It is made deeper by a marginal rim, which does not go completely around it. At the bottom of the cavity is a circular depression, called the fossa of the acetabulum, which lodges a mass of fat, and to

the margins of which are attached the ligamentum teres. There is a deep notch on the lower border, called the cotyloid notch, which is converted into a foramen by a tough ligamentous band which passes across it; through this formen the nutrient vessels and nerves enter the hip joint.

8. The *superficial palmar arch* is formed by the ulnar artery, and is completed by the ulnar artery anastomosing with a branch of the radial (superficial volar or princeps pollicis). It gives off the four digital branches.

The surface marking is a line drawn transversely across the palm from a point where the web of the thumb joins the palm.

The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries.

The suface marking is a line drawn transversely across the palm, one-half inch nearer the wrist than the superficial arch.

9. The abdomen may be divided into nine regions by four lines, two of which are vertical and two horizontal. There is no uniformity in the location of these lines. One method consists in drawing the vertical lines through the middle of Poupart's ligament, the upper horizontal line through the lowest point of the costal border, and the lower horizontal line through the anterior superior iliac spines. The regions in the upper row are the right hypochondriac, epigastric, and left hypochondriac; in the middle row, the right lumbar, umbilical, and left lumbar; in the lowest row, the right inguinal, hypogastric, and left inguinal.

10. The *inguinal canal* is an oblique canal situated a little above and running parallel with Poupart's ligament. It is from an inch and a half to two inches in length, runs downward and inward, and extends from the internal abdominal ring to the external abdominal ring.

Its *boundaries are: In front:* the skin, superficial fascia, aponeurosis of the external oblique, and (for its outer third) the internal oblique. *Behind:* the conjoined tendon, the triangular fascia, the transversalis fascia, subperitoneal fat, and peritoneum. *Above:* the fibers of the internal oblique and transversalis. *Below:* Poupart's ligament and the transversalis fascia.

Contents: the spermatic cord in the male, and the round ligament in the female.

11. The *saphenous opening* is an oval aperture in the deep fascia of the upper and front part of the thigh. It is about an inch and a half long and half an inch wide, and the saphenous vein passes through it in order to reach the femoral vein. It is covered by the cribriform fascia, and is of importance because through it a femoral hernia makes its way towards the surface.

12. The kidneys are situated in the back of the abdominal cavity, one on each side of the vertebral column, behind the peritoneum, and extending from the eleventh rib to the second or third lumbar vertebra. The right kidney is about half an inch lower than the left one. Each kidney is about four inches long, two inches broad, and one inch thick, and weighs about four and a half ounces. The kidneys are kept in place by their vessels, fatty tissue, and the peritoneum. The shape is characteristic. Each kidney is surmounted by the suprarenal gland, is surrounded by a capsule, and consists of a cortical and medullary portion. In the cortical portion are found the Malpighian corpuscles, which are tufts of capillaries, and are surrounded by a capsule which is continuous with the uriniferous tubule which ends in the renal papilla.

PHYSIOLOGY

1. *Digestion of fats.* In the stomach, the gastric juice dissolves the connective tissue binding the fat cells together, and sets free the fat, which passes into the duodenum. Here the steapsin of the pancreatic juice splits up the fats into glycerin and fatty acids.

Absorption of fat. "Fat is not absorbed as fat, but as glycerin and fatty acid or soap. It is generally accepted that the fatty acid set free in the intestine is dissolved by the bile salts, and in this way, together with the glycerin, is absorbed by the columnar cells, but that during absorption a lipase which is contained in the columnar cells re-synthesizes, by reverse action, the glycerin and fatty acid." In this way minute fat particles are found near the bases of the columnar cells, and these may be demonstrated by staining with a 1 per cent. solution of osmic acid. The fat globules are further taken up from the columnar cells by some of the lymphocytes, which are capable of exhibiting ameboid movements, and which are found in the lymphoid tissue between the columnar cells and the central lacteal. The fat is then deposited in the central lacteal by these ameboid cells, and in this way it gets

into the general lacteal stream, and thence into the thoracic duct. The bile salts, which have been absorbed by the columnar cells, in all probability get into the portal vein radical, and in this way are taken back to the liver to be excreted again in the bile. After a fatty meal minute globules of fat may be demonstrated in the blood plasma of an animal; but they disappear rapidly, possibly existing in a soluble and invisible form absorbed to the blood proteins before they are deposited in the fat depots of the body."

2. *Functions of the blood:* The *red blood cells* carry oxygen from the lungs to the tissues. The *white blood cells:* (1) Serve as a protection to the body from the incursions of pathogenic microorganisms; (2) take some part in the process of the coagulation of the blood; (3) aid in the absorption of fats and peptones from the intestine, and (4) help to maintain the proper proteid content of the blood plasma. The function of the *platelets* is not determined; it is possible that they take some part in the coagulation of the blood. The *plasma* conveys nutriment to the tissues; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

3. *How* the *urine is secreted* is not settled. *Bowman's theory* was that the water of the urine, together with the soluble inorganic salts, are taken from the capillaries of the glomeruli through the epithelial cells of Bowman's capsule; and that the nitrogenous substances (urea, uric acid, creatinin, etc.) are excreted by the cubical cells which line the convoluted tubules. *Ludwig's theory* was that the glomeruli are little more than filters, and that the urine in a dilute form is taken out of the blood by the glomeruli (by filtration), and that in its passage through the tubules these latter absorb some of the water.

Many also believe that urinary excretion is partly due to mechanical filtration and partly to secretory or selective action of the glomerulus; at the same time the epithelium of the tubules is believed to contribute substances to the urine.

Bowman's theory was based on the general structure of the kidneys, the high blood pressure in the renal arteries, and the low blood pressure in the renal veins. According to *Ludwig's theory*, the function of Bowman's capsule is purely physical (filtration), and the

function of the convoluted tubules is physiological (reabsorption).

The normal constituents of urine are: Water, urea, uric acid, urates, hippuric acid, creatin, creatinin, xanthin, hypoxanthin; sulphates, chlorides, and phosphates of sodium and potassium; phosphates of magnesium and calcium; nitrogen, and carbon dioxide.

4. *Association areas of the brain.* "When all the motor and sensory areas have been marked off, a considerable portion of the cortex still remains. This remainder consists of areas called association areas in which, it is supposed, elaborated impressions arrive from all the sensory areas and are combined into perceptions and conceptions. Four association areas are usually described: (1) frontal, immediatedly anterior to the motor area; the part of this region which forms the frontal pole is delimited as a special area, the prefrontal; (2) parietal, between the general sense area and the visual area; (3) temporal, occupying the greater part of the temporal lobe; (4) insular, the island of Reil."—(Lickley's *Nervous System.*)

5. *Menstruation* is a periodic disturbance in the female characterized by a bloody discharge from the uterine cavity; it occurs periodically during the time of the woman's sexual activity, but is temporarily suspended during pregnancy and early lactation. The relation existing between ovulation and menstruation is not known. The two processes are usually coexistent, but they may be independent of each other. The following theories have been held: (1) Menstruation is dependent upon ovulation; (2) ovulation is dependent upon menstruation; (3) they are independent of each other; (4) they both depend upon some other (at present unknown) cause. Each month the mucous membrane of the uterus becomes thickened and congested, and some of the small bloodvessels rupture; the blood, with superficial epithelium of the uterus and the secretion of the uterine glands, forms the menstrual flow. When the flow ceases, the mucous membrane of the uterus is gradually regenerated and returns to its original condition.

6. "The waves of sound are gathered together by the pinna and external auditory meatus, and conveyed to the membrana tympani. This membrane, made tense or lax by the action of the tensor tympani and laxator tympani muscles, is enabled to receive sound waves of either high or low pitch. The vibrations are conducted across the middle ear by a chain of bones to the foramen ovale, and by the column of air of the tympanum

to the foramen rotundum, which is closed by the second membrana tympani, the pressure of the air in the tympanum being regulated by the Eustachian tube. The internal ear finally receives the vibrations, which excite vibrations successively in the perilymph, the walls of the membranous labyrinth, the endolymph, and, lastly, the terminal filaments of the auditory nerve, by which they are conveyed to the brain."—(Brubaker's *Physiology.*)

7. *The function of the spleen:* The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

The function of the thyroid is not definitely settled: (1) it has some trophic function, regulating oxidation in the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances, and (3) it produces an internal secretion.

The *functions of the pancreas* are: (*a*) The secretion of the pancreatic juice, which (1) changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin; (2) converts startch into maltose; (3) emulsifies and saponifies fats, and (4) causes milk to curdle. (*b*) The manufacture of an internal secretion.

8. *Blood pressure* is the force exercised by the blood against the walls of the blood vessels. It is regulated by the force and frequency of the ventricular systole, the quantity of blood contained in the vessels, the elasticity of the walls of the arteries, and the resistance in the capillaries.

9. *Five enzymes:*

ENZYMES.	ORIGIN.	FUNCTIONS.
Ptyalin.	Saliva	Changes starches into dextrin and sugar.
Pepsin.	Gastric juice.	Changes proteids into proteoses and peptones in an acid medium.

ENZYMES.	ORIGIN.	FUNCTIONS.
Trypsin.	Pancreatic juice.	Changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin in an alkaline medium.
Amylopsin.	Pancreatic juice.	Converts starches into maltose.
Steapsin.	Pancreatic juice.	Emulsifies and saponifies fats.

10. *Impregnation* is the result of the meeting of a live and healthy spermatozoon, with a live and healthy ovum, in a suitable medium (generally the Fallopian tube). During coitus the seminal fluid is ejected into the upper part of the vagina and against the cervix of the uterus; the spermatozoa enter the uterine cavity (either by the suction of the uterus or by their own vibratile motion) and so pass on to the Fallopian tube. Several spermatozoa may surround an ovum, or even pierce the perivitelline space; but only one spermatozoon enters the vitellus. This spermatozoon loses its tail; and its head becomes the male pronucleus. The male pronucleus and the female pronucleus now fuse together and fecundation is completed.

CHEMISTRY.

1. *Organic chemistry* is the chemistry of the carbon compounds.

Inorganic chemistry is the chemistry of such substances as do not contain carbon.

2. *Qualitative analysis* is the determination of the nature of the elements which enter into the composition of a substance. *Quantitative analysis* is the determination of the amount as well the nature of the elements which enter into the composition of a substance.

3. *Valence* is the combining power of an atom of an element as compared with that of an atom of hydrogen. Thus oxygen has a valence of two, because one atom of oxygen combines with two of hydrogen; similarly nitrogen has a valence of three, and carbon has a valence of four.

4. An *alcohol* is the hydroxide of a hydrocarbon radical, and is capable of reacting with an acid to form an ester. Alcohols are termed monoatomic, diatomic,

and triatomic, according to the number of hydroxyl groups which they contain. Alcohols which contain the characterizing group CH_2OH are called primary alcohols; those which contain the characterizing group CHOH are called secondary alcohols; and those which contain the characterizing group COH are called tertiary alcohols.

The chief forms are methyl, ethyl, propyl, butyl and amyl alcohols; also glycerol or glycerin, which is a triatomic alcohol.

Alcohols may be produced by the saponification of their esters by caustic potash; primary alcohols may also be produced by the reduction of aldehydes or anhydrides; and secondary alcohols may be produced by the reduction of ketones.

5. *Carbohydrates.*—The name carbohydrate was originally given to the group of compounds found chiefly in vegetables, and containing the elements carbon, hydrogen and oxygen; the molecule contained six or some multiple of six times the atom of carbon, and hydrogen and oxygen in the proportion to form water. The name is not a good one, and the definition is not accurate; but the term is still used to denote a group of substances which includes the various starches, sugars, and gums, etc. They are generally divided into three groups: monosaccharids, disaccharids, and polysaccharids.

6. *Composition of urine:*

	(PARTS IN 1000)	
Water	950.00	
Urea	28.00	
Uric acid	0.60	Organic
Hippuric acid	0.35	
Creatinin	0.65	
Extractives	8.00	
Sodium chloride	8.00	
Phosphoric acid	2.00	
Sulphuric acid	1.25	
Lime (CaO)	0.25	Inorganic.
Magnesia (MgO)	0.30	
Potash (K_2O) and soda (Na_2O)	0.60	
Total	1000.00	

7. *Test for albumin in the urine:* "The urine must be perfectly clear. If not so, it is to be filtered, and if this does not render it transparent it is to be treated with a

few drops of magnesia mixture and again filtered. The reaction is first observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3."

Quantitative test for albumin in urine: "Place 100 c.c. of the clear urine in a beaker of 200 c.c. capacity; if alkaline, acidulate faintly with acetic acid. Heat the beaker over the water-bath, add one or two drops of acetic acid, largely diluted with water, when nearly boiling; continue boiling gently until the diffuse precipitate has collected in lumps. Have ready a small filter whose weight, with that of watch-glasses and clamp has been determined. Collect the coagulated albumin upon the filter, wash with H_2O containing a little HNO_3, then with boiling H_2O until the filtrate no longer forms a precipitate with $AgNO_3$, then with alcohol, and finally with ether. Dry the filter and contents in the air-oven, and weigh between the watch-glasses. The difference between this last weight and the one first determined is the weight of dry albumin in 100 c.c. urine, which, multiplied by 1/100 the quantity in twenty-four hours, gives the elimination of albumin in twenty-four hours."—(Witthaus' *Urinalysis.*)

Albuminuria is found: "(1) In fevers, as typhoid and pneumonia. (2) In valvular heart lesions, degeneration of the heart muscles, diseases of the coronary arteries, impeded pulmonary circulation, in pregnancy by pressure upon the renal veins, in intestinal catarrh, and in Asiatic cholera. (3) In purpura, scurvy, leukemia, pernicious anemia, jaundice, diabetes, and syphilis. (4) After taking lead, mercury, iodine, phosphorus, arsenic, antimony, chloroform, cantharides, oxalic, carbolic, salicylic, or the mineral acids, turpentine and nitrates. (5) In large amounts in acute nephritis and chronic parenchymatous nephritis; in small amounts in chronic interstitial nephritis, and amyloid kidney."—(Witthaus' *Essentials of Chemistry.*)

8. "(*a*) *Qualitative test for sugar in the urine:* Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of

powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color."—(Witthaus' *Essentials of Chemistry.*)

(*b*) Method for the *quantitative estimation of sugar in urine: Fehling's method:* The solution is made as follows:

I. Dissolve cupric sulphate.....51.98 gm.
in water to.....500.00 c.c.
II. Dissolve Rochelle salt.....259.9 gm.
in sodium hydroxide solution sp. gr. 1.12 to 1,000 c.c. (Piffard)

When required for use, one volume of I is to be mixed with two volumes of II. The copper contained in 10 c.c. of this mixture is precipitated completely, as cuprous oxide, by 0.05 gm. of glucose.

"To determine the quantity of sugar, place 10 c.c. of the mixed soln. in a flask of about 250 c.c. capacity, dilute with H_2O to about 30 c.c., and heat to boiling. On the other hand, the urine to be tested is diluted and thoroughly mixed with four volumes of H_2O if it be poor in sugar, or with nine volumes of H_2O if highly saccharine, and a burette filled with the mixture. When the Fehling soln. boils, add a few gtt. NH_4HO and then 5 c.c. of the urine from the burette, boil again, and continue the alternate addition of diluted urine and boiling of the mixture until the blue color is quite faint. Now add the diluted urine in quantities of 1 c.c. at a time, boiling after each addition until the blue color just disappears. Have ready a small filter, and, having filtered through it a few gtt. of the hot mixture, acidulate the filtrate with acetic acid, and add to it 1 gtt. soln. of potassium ferrocyanide. If a brownish tinge be produced, add another ½ c.c. of dil. urine to the flask, boil, and test with ferrocyanide as before. Continue this proceeding until no brown tinge is produced. The burette reading, taken at this point, gives the number of c.c. of dilute urine containing 0.05 gm. glucose, and this divided by 5 or 10, according as the urine was diluted with 4 or 9 volumes of H_2O, gives the number of c.c. urine containing 0.05 gm. sugar. The number of c.c. urine passed in twenty-four hours divided by 20 times the number of c.c. containing 0.05 gm. glucose, gives the elimination of glucose in twenty-four hours in grams.

Example: Urine in 24 hours = 2,436 c.c.
Fehling's soln. used = 10 c.c.
Urine diluted with 4 vols. H_2O
Burette reading = 18.5 c.c.

$$\frac{18.5}{5} = 3.7 = \text{c.c. urine containing 0.05 gm. glucose.}$$

$$\frac{2{,}436}{3.7 \times 20} = 32.92 = \text{grams glucose eliminated in 24 hours."—(Witthaus' } \textit{Urinalysis.})$$

Significance of sugar in the urine: Diabetes mellitus; brain lesions involving the floor of the fourth ventricle; cerebral tumors and hemorrhages; some nervous diseases, sciatica, tetanus; certain hepatic disorders; pneumonia, typhoid, or some febrile disease, particularly during convalescence; after ingestion of chloral, morphine, and some other poisons.

9. The color of the blood is due to the presence of hemoglobin in the red corpuscles; in arterial blood it is loosely combined with oxygen, and is called oxyhemoglobin.

10. RESPIRATORY CHANGES IN THE LUNGS. *"Oxygen:* During a normal inspiration atmospheric air is drawn into the larger bronchi; here the tension of the oxygen is greater than the tension of that oxygen which is in the infundibula, where the oxygen tension in man has been calculated to be 13 per cent. of an atmosphere of oxygen. The gases in the infundibula, and consequently in the alveoli, are separated from the blood plasma in the lung capillaries by the flattened cubical epithelium of the alveoli and the endothelium lining the capillaries; it is believed that oxygen diffuses from the alveoli through the two kinds of epithelium into the plasma of the venous blood which has just arrived in the lung, and which is collected in the distended capillaries. Now, oxygen accumulates in the blood, which is consequently becoming rapidly arterial, until its tension rises to 38.5. It is obvious, therefore, that there must be another factor at work besides diffusion to account for this difference of oxygen tension. The epithelium which lines the alveoli is cuboidal in shape, and was originally derived from the epithelium lining the alimentary canal, and in function it is probably secretory. The inference to be drawn, therefore, is that some oxygen diffuses from the alveoli into the plasma of the lung capillaries so long as the oxygen in the alveoli is at a higher tension than that in the plasma; when, however, a state of equilibrium is reached, the cubical cells,

possibly controlled by the vagi, begin to secrete oxygen from the alveoli into the blood plasma.

"*Carbon-dioxide* leaves the venous blood in the pulmonary capillaries and gets into the alveolar air, where its tension is usually 5 per cent. in males and 4.7 per cent. in women and children. The tension of carbon-dioxide in venous blood is higher than 5 per cent.; so that it is by diffusion that the CO_2 leaves the venous blood and enters the air in the alveoli, and it is by a continuation of the process of diffusion that the CO_2 leaves the air in the alveoli and enters the bronchioles." —(Lyle's *Physiology*.)

PATHOLOGY.

1. An *aneurysm* is a pulsating sac containing blood, and communicating with the lumen of an artery.

A *true aneurysm* is one in which the sac is composed of one or more of the coats of the artery.

A *false aneurysm* is one whose sac contains no arterial coat, but is formed of condensed perivascular tissue.

Causes of true aneurysm: Some preceding disease is always present, usually atheroma; and dilatation occurs only after the middle coat has been weakened. Contusions or strains may rupture the middle coat, and so produce weakness, which subsequently allows dilatation to occur. Increase in the blood pressure by sudden and violent exertions tends to the production of aneurysm.

Varieties: There are three forms: (1) *Sacculated aneurysm* is one in which the dilatation springs from one side of the artery only, and in which the sac communicates with the artery by a comparatively narrow opening. (2) *Fusiform aneurysm* is due to a general dilatation of the whole circumference of an artery. Its progress is slower than that of the sacculated variety, and there is little or no laminated clot at first. It usually ends in the formation of a sacculation at one part. (3) *Dissecting aneurysm* is due to blood getting into the middle coat and stripping it up. It cannot be recognized during life.

Usual locations: Thoracic aorta, abdominal aorta, popliteal, femoral, carotid, subclavian, innominate, axillary, and iliac arteries.

Symptoms: A soft, elastic, pulsatile tumor in the line of an artery; pulsation ceases if pressure is made on the artery above the tumor, and reappears on relaxing the pressure; similar pressure on the artery below the tumor causes it to enlarge; a systolic bruit can often

be heard over the tumor; the pulse below an aneurysm is weaker than the corresponding pulse in the opposite limb; there may be pain, and weakness of the part affected.

Treatment: Rest in bed; restricted diet (both solid and liquid); iodide of potassium in doses of gr. xv to xx; hypodermic injection of gelatin; pressure; ligature, various methods (Antyllus, Anel, Hunter, Wardrop, Brasdor); extirpation of the sac; and aneurysmorrhaphy.

2. *Peptic ulcer* "is a peculiar form of ulceration generally found in the posterior wall in the lesser curvature at the pyloric end of the stomach, and probably due to the action of the gastric juice upon diseased tissue. It is thought to be due to a thrombosis in a vessel giving rise to a local area of necrosis, which, being no longer able to resist the action of the gastric juices, undergoes digestion. Infection, embolism, infarction, spasmodic contractions of the bloodvessels, are all thought to have some bearing upon the formation of these ulcers. They are found most frequently in chlorotic girls in whom there is an associated increase in the acidity of the gastric juice. The peptic ulcer is usually single and small, but is sometimes multiple and large. It is generally round or slightly oval, 2 to 4 cm., wider at the top than at the bottom, and is accompanied by very little inflammation. The mucous layer alone may be involved, or the destruction may extend to the submucosa, the muscularis, or even to the serous covering. In healing there is cicatricial tissue formed which on contracting gives rise to a peculiar white stellate scar. If the ulcer was in the region of the pylorus, stenosis of that outlet may result. From the floor of the healed ulcer carcinoma sometimes develops. The two dangerous results are perforation or hemorrhage. The perforation is usually smooth and round and looks as if it had been punched out. Sometimes there have been adhesions to neighboring organs, so that damage is prevented, but more frequently the gastric contents will escape into the abdominal cavity and give rise to peritonitis. Hemorrhage is the result of ulceration of a large arterial branch. This is more common than perforation. The amount of blood lost may cause death or there may be merely a constant oozing. Peptic ulcers sometimes occur in the upper end of the duodenum close to the pyloric orifice and also in the lower portion of the esophagus."—(McConnell's *Pathology.*)

3. The *tubercle bacillus* is a rod-shaped organism,

straight or slightly curved, with rounded ends, about 2 to 4 microns long by 0.1 to 0.5 micron broad, it often has a beaded appearance, is non-motile, has neither flagella nor spores, is aerobic, is acid-fast, and stains well by Ehrlich's or Ziehl-Nielsen's or Gabbett's method, also by Gram's method.

4. *Jaundice* "is a staining of the tissues by biliary pigments that have been conveyed by the blood stream. It is a symptom common to most diseases of the liver. There were formerly thought to be two forms of jaundice, the obstructive or hepatogenous and the non-obstructive or hematogenous. The latter variety probably does not really exist, all icterus being due to biliary coloring matter. There are, however, cases in which no mechanical obstruction can be observed, either by absence of bile in the feces or by lesions in the liver. This discoloration is seen in some infectious diseases and after experiments in which various substances have been injected into the blood. By the destruction of red cells, hemoglobin is set free and this material, from which the bile pigments are formed, is provided in excess. Catarrhal jaundice resulting from obstruction to the duct by an inflammation of its mucous membrane is the commonest form. Any obstruction from within or without will, however, cause it. Microscopically, it is seen that the biliary capillaries are distended and the liver cells contain more or less pigment. The bile escapes from its normal channels, is taken up by the lymphatics, from which it passes into the circulation and thence to the tissues throughout the body. The secretion and exudations of the body may be distinctly tinged. The tissue first stained is the intima of the blood vessels; finally the skin and the sclera, where it is seen most characteristically. According to the duration, the color will vary from a light yellow to a dark bronze-green; the longer continued, the darker the color. If little or no bile escapes, the feces will usually be very light in color, clay-like. The retention of bile within the body is generally accompanied by quite marked disturbances, particularly of the nervous system. As the flow of bile is re-established the discoloration gradually disappears."—(McConnell's *Pathology.*)

5. *Anaphylaxis* is a condition of hypersusceptibility or supersensitiveness of an organism to foreign proteins; it may be induced when a second injection of toxin or of serum is given within ten or twelve days after the first. It is the opposite of immunity.

6. *Leucocytosis* is an increase in the number of white corpuscles in the blood; it is an essential feature of leukemia, but it is also found in other conditions. Leucocytosis may be physiological or pathological.

A *physiological leucocytosis* is a leucocytosis which is found in certain physiological conditions; it is generally moderate and of brief duration. It is found in the newborn, after parturition, after exertion, after a cold bath or massage, during pregnancy, and during digestion.

A *pathological leucocytosis* is a leucocytosis which is found in certain pathological conditions; it is generally found in inflammatory, toxic, and infectious conditions. As a rule, the polynuclears are increased.

7. *Pellagra* is a disease of unknown origin, endemic or epidemic in some temperate and subtropical countries, and characterized by nervous, gastric and cutaneous symptoms. It is said to be due to maize; it has also been attributed to a parasite transmitted by the *Simulium reptans.*

8. The *varieties of vesical calculi* are: Uric acid, ammonium urate, calcium oxalate, phosphatic, cystin, and xanthin.

9. *Technique of the Gram stain:* After the cover glass has been smeared and fixed it is stained and washed and then put in Gram's solution for thirty seconds; this solution consists of iodine, 1 gm., potassium iodide, 2 gm., and water, 300 c.c.; it is then washed in 95 per cent. alcohol until the color ceases to come out of the preparation, and is then dried and mounted in balsam. Its value lies in the fact that certain bacteria retain this stain, while others give it up. Hence, it is made use of to differentiate certain organisms that may resemble each other in size and shape.

10. *Eosinophilia* may be found in: Bronchial asthma, scarlet fever, myelogenous leukemia, trichinosis, uncinariasis, filariasis, echinococcus disease, urticaria, pemphigus, prurigo, psoriasis.

SYMPTOMATOLOGY.

1. *Acute nephritis. Causes:* Cold, exposure, scarlet fever, diphtheria, other infectious diseases, traumatism, pregnancy, certain irritant drugs, skin diseases and extensive burns. *Symptoms:* "In mild cases, slowly developing dropsy with anemia, shortness of breath or dyspnea, and weakness are the only symptoms, the diagnosis being confirmed by the results of urinary examination. Usually, however, it begins suddenly

with nausea, violent and persistent vomiting, fever, and dull pain over the kidneys, following the course of the ureters. There is a frequent desire to urinate, and diarrhea, harsh and dry skin, and a quick, tense, and full pulse are present. Dropsy soon appears, beginning first in the eyelids and face, but later becoming generalized. Anemia and weakness are marked, particularly in post-scarlatinal cases. Uremic symptoms may develop at any time during the attack. The affection lasts from one to four weeks. The *urine* is of high specific gravity, 1025 to 1030, scanty, smoky (like beef washings) in color, due to the presence of blood. Albumin is present in large quantities, and the microscope reveals hyaline, blood, granular and epithelial casts of the uriniferous tubules, blood corpuscles, uric acid, urates, oxalate crystals, and epithelium. The total amount of urea eliminated during the twenty-four hours is lessened from one-fourth to one-half. The amount of phosphates and chlorides is also lessened."—(Hughes' *Practice of Medicine.*)

2. *Symptoms of rheumatic fever:* The affected joints are generally the larger ones, and these are tender, swollen, hot, and painful; the trouble seems to flit from one joint to another; the fever is irregular, and may reach 103° F.; the perspiration is acid and may be copious; the urine is scanty and high colored; the tongue is coated, the appetite is lost, and the bowels are apt to be constipated; moderate leucocytosis and secondary anemia may be observed.

3. ERYSIPELAS. "*Etiology: Predisposing causes:* (1) A wound or abrasion; (2) constitutional debility; (3) bad hygiene. *Exciting causes: Streptococcus erysipelatis,* which is indistinguishable from the *Streptococcus pyogenes.*

Symptoms: Malaise with rigor and headache. Rash appears within twenty-four hours; it appears first round the wound, which breaks open; it is of a vivid red color, which fades on pressure. Pain and swelling are not much marked. The eyelids and scrotum when affected become very edematous. Vesicles and bullæ form superficially, and a fine desquamation occurs, with some staining of the skin as the rash fades away. The margin is well marked, rather gyrate, slightly swollen, rapidly advancing. Sloughing of the skin rarely occurs, and then usually in cases of scrotal affection. Lymphatic glands in the neighborhood are enlarged and tender. Extension may occur by the lymphatics or veins to the deep structures, or pyemia may be set up. Con-

stitutionally, the patient is very ill, with high temperature—102°-104° F. Delirium is frequent, especially when the scalp is affected. Vomiting is common.

Varieties: Facial erysipelas is often apparently idiopathic and recurrent. It is accompanied by great edema; it is liable to be complicated by meningitis. *Faucial erysipelas* spreads from the exterior to the pharynx; causes great swelling of the parts, with a tendency to edema glottidis. Sloughing or ulceration may follow. Massive enlargement of the glands at the angle of the jaw. *Scrotal erysipelas* causes great edema, and in children a tendency to sloughing. *Cellulo-cutaneous erysipelas* partakes of the character of both cellulitis and erysipelas, affecting the skin and subcutaneous tissue. The margin is less sharply defined; the tendency to general septic infection and sloughing of the skin is greater than in either of the simpler diseases."—(Grove's *Synopsis of Surgery.*)

4. *Symptoms of diphtheria:*—General malaise, slight fever, headache, backache, stiffness of the neck and swelling at the angles of the jaws; the tonsils are red and swollen, the soft palate is congested, and whitish patches of necrosed tissue appear, first on the fauces, these patches are surrounded by a deep scarlet inflamed area of mucous membrane, and spread to tonsils and uvula; this membrane strips off with difficulty, leaves a bleeding surface, and reforms; the lymphatic glands of the neck usually enlarge, but do not suppurate as a rule; the temperature varies from 100° F. to about 102° F., but it may be subnormal; albumin is generally present in the urine. *Complications:*—Pneumonia, pleurisy, adenitis, otitis media, paralysis, endocarditis, nephritis.

5. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist rales at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

6. In a *typical case of croupous pneumonia*, "there may be slight catarrhal symptoms for a day or two; but as a rule the disease sets in abruptly with a severe chill, which lasts from fifteen to thirty minutes or longer. In no acute disease is the initial chill so constant or so severe. The patient may be taken abruptly in the midst of his work, or may awaken out of a sound sleep in a rigor. The temperature taken during the

chill shows that the fever has already begun. If seen shortly after the onset, the patient has usually features of an acute fever, and complains of headache and general pains. Within a few hours there is pain in the side, often of an agonizing character; a short, dry, painful cough begins, and the respirations are increased in frequency. When seen on the second or third day, the picture in typical pneumonia is more distinctive than that presented by any other acute disease. The patient lies flat in bed, often on the affected side; the face is flushed, particularly one or both cheeks; the breathing is hurried, accompanied often with a short expiratory grunt; the alæ nasi dilate with each inspiration; herpes is usually present on the lips or nose; the eyes are bright, the expression is anxious, and there is a frequent short cough which makes the patient wince and hold his side. The expectoration is blood-tinged and extremely tenacious. The temperature may be 104° or 105° F. The pulse is full and bounding and the pulse-respiration ratio much disturbed. Examination of the lungs shows the physical signs of consolidation—blowing breathing and fine râles. After persisting for from seven to ten days the crisis occurs, and with a fall in the temperature the patient passes from the condition of extreme distress and anxiety to one of comparative comfort." (From Osler's *Practice*).

7. An *embolus* arising from the *saphenous vein* will most likely lodge in a branch of the pulmonary artery. It may cause sudden death; or syncope, and precordial distress, followed by suffocation. Or there may be sense of oppression in the chest, rapid respiration, dyspnea, pallor followed by cyanosis, exophthalmos, cold sweat, chills, convulsions.

8. An *embolus* arising from the *mitral valve* may lodge in any of the systemic arteries. It may cause necrosis, infarction, degeneration or death of the part supplied by the affected artery, unless adequate collateral circulation is established. The symptoms are those of local anemia and (possibly) of infection. Pain, chill, fever, and annihilation of function may be observed.

9. *Acute poliomyelitis* occurs most often in childhood, and is characterized by sudden paralysis of one or more limbs or of individual muscle-groups, and followed by rapid wasting of the affected parts, with reaction of degeneration and deformity. The onset is sudden and marked by fever, vomiting, convulsions, or even coma. Paralysis and atrophy of the muscles, with reactions of degeneration, then present themselves. It occurs usually during the first three years

of life and most often during the summer months. It sometimes occurs in epidemics.

The treatment during the initial stage consists in rest in bed, restricted diet, fractional doses of calomel, and sponging, or small doses of phenacetin if the fever and nervous symptoms are marked. An ice-bag should be placed along the spine, or mild counterirritation to the spine by mustard plasters may be practised. After the acute symptoms have subsided, electricity and passive movements may be employed. Deformities may result and will require the application of mechanical apparatus or the performance of surgical operations for their correction. (*Pocket Cyclopedia.*)

10. The chief anomalies of the rate and rhythm of the heart are tachycardia, bradycardia, palpitation, and arrhythmia. The chief forms of arrhythmia are sinus irregularities, extra-systole, nodal rhythm, auricular fibrillation, irregularities due to failure of the conducting power of the primitive bundle, failure of contractility of the ventricle, and pulsus alternans.

OBSTETRICS

1. *Development of the fertilized ovum.* "(1) When the ovum is mature, two small cells are detached from the main body of cells; these are called polar globules. It was formerly supposed that these were associated with the disappearance of the germinal vesicle, but recent experiments have demonstrated that the germinal vesicle plays an active part in their formation. This can take place independently of fecundation. (2) The portion of the ovum remaining after the throwing off of the polar globules is called the 'female pronucleus.' (3) Fecundation is effected by the penetration of the head of one spermatozoon. This is called the 'male pronucleus.' (4) The male and female pronucleus coalesce. The ovum is now called the oösperm, or blastosphere. (5) The *segmentation* of the nucleus and vitellus, *i.e.* they both split into two masses, these into four, and so on until a large number of segments are formed. This is known as the morula, moriform body, or mulberry mass. (6) A clear fluid is secreted within the ovum, which presses these segments to the surface of the ovum, where they form a double layer of cells, differing somewhat in size. The outer and larger is termed the *epiblast* or *ectoderm*, and the inner and smaller the *hypoblast* or *endoderm*. Together they are known as the blastodermic vesicle. (7) There then appears upon the outside of the vitellus a small oval elevation, surrounded

by a depression, which is called the *area germinativa*. (8) There appears in the area germinativa a small, dark line called the *primitive trace*. About this line will be grouped the various parts of the embryo, the rest of the ovum serving only as a covering and for nutriment. (9) A covering for this trace or embryo is now formed. Thus far the vitelline membrane has been sufficient. The embryonic line sinks into the center of the ovum, while the edges of the external blastodermic layer about the area close around it, inclosing it in a sac called the *amnion*. Between the amnion and the embryo, fluid at a later period is deposited; this constitutes the liquor amnii. The vitelline membrane then disappears."—(Landis's *Obstetrics*.)

2. *The movements in the mechanism of L.O.A.: Flexion*, by which the chin tilts up and the occiput down, so as to get the long diameter of the head more or less endwise to the pelvic brim. *Descent*, by which the head descends, occiput first, through the brim into the cavity, down to the inclined planes of the pelvic floor. *Rotation*, by which the occiput glides along the left anterior inclined plane, downward, forward and inward to the symphysis pubis; and the forehead glides along the right posterior inclined plane to middle of sacrum. *Extension*, by which occiput escapes under pubic arch and rises up outside, towards mons veneris, while forehead, nose, mouth, and chin successively escape at perineum. *Restitution*, by which occiput turns towards mother's left thigh, in consequence of shoulders rotating upon inclined planes—the right shoulder to the pubes, the left to the coccyx.—(From King's *Obstetrics*.)

3.

PLACENTA PRÆVIA.	ABRUPTIO PLACENTÆ
Most commonly manifests itself after the sixth month of gestation, but may occur as early as the second month.	Most commonly occurs during the first stage of labor, but may occur at any time during the last three months of pregnancy.
The hemorrhage is abrupt, but painless.	The hemorrhage is sudden, and generally is attended with sharp pain.
There are generally repeated hemorrhages of increasing severity.	Hemorrhage persists until the uterine contents are evacuated or the patient perishes.

PLACENTA PRÆVIA.	ABRUPTIO PLACENTÆ.
There is an edematous condition of the cervix and lower uterine segment, with marked pulsation.	Vaginal examination reveals no deviation from the condition normal to pregnancy.
Cervix is generally quite patulous, and within may be detected the placenta.	The cervix is perhaps (if labor be initiated) slightly patulous.
The placental bruit is situated low down.	The placental bruit is in normal position.

—(Dorland's *Obstetrics.*)

4. *Uterine inertia* may be *caused* by: Debilitated constitution, exhausting disease; uterus weakened because of congenital malformation, inflammation, or too frequent child-bearing; adhesions to neighboring structures; tumors of the uterus or neighboring tissues; distention of the bladder or intestine; displacement of the uterus; premature escape of the liquor amnii; pregnancy in an old primipara; hydramnios; twin pregnancy; fright or mental emotion.

The cervix dilates slowly or not at all; if the membranes are ruptured the fetus makes little or no advance; the woman shows evidences of fatigue and may be anxious or restless; the skin gets dry, the pulse small and rapid, the temperature elevated, the tongue dry and furred, nausea and vomiting may supervene, and delirium and coma may follow. —(From Webster's *Obstetrics.*)

Treatment consists in removing the cause if possible; the bladder and bowel should be emptied; opium, morphine and chloral may be given so that the patient may get a little sleep, at the same time food may be administered; the uterus may be massaged through the abdominal walls; hot vaginal douches are sometimes helpful; the vagina may be distended with a rubber bag; if the membranes are ruptured, a Champetier de Ribes bag may be placed in the lower part of the uterus; an anesthetic may be necessary; quinine, strychnine, and ergot have been recommended by some, and condemned by others; the newest remedy is pituitrin, which may be injected into the muscles in doses of from one to one and a half cubic centimeters, provided that the cervix is dilated and that there is no obstruction to delivery.

5. *Cesarean section.*—"*Indications:* The cases in

which it is performed are: (1) Extreme deformity of the pelvis, in which delivery by forceps and version is excluded, and in which craniotomy is either impossible or would be more dangerous to the mother than cutting into the abdomen and uterus; and in which there is not room for a successful symphyseotomy. Such cases present the '*positive*' indication for cesarean section; there is nothing else to be done. Flat pelves having a conjugata vera of 2¼ inches or less, and justo-minor pelves with a conjugata vera of 2½ inches or less, present this positive indication; (2) cases of more moderate pelvic contraction in which craniotomy is possible, but cesarean section is agreed upon to *save the life of the child;* (3) mechanical obstruction in the pelvis from fibroid, cancerous, bony, or other tumors which cannot be pushed up out of the way or be safely removed; (4) irreducible impaction of a *living* child in transverse presentations; (5) in women dying near the end of pregnancy the child, if alive, is rapidly delivered by *post-mortem* cesarean section; (6) various other obstructions from inflammatory adhesions, atresia, constrictions, etc., of the vagina, and uterine displacements, may rarely require the operation; (7) recently the operation has been done in eclampsia cases, where more conservative methods of rapid delivery were impracticable; and (8) in placenta prævia, chiefly with a view to lessen the infant mortality attending the usual treatment of this complication."—(King's *Obstetrics.*)

Cesarean section.—"Fluidextract of ergot, ℥xx, is injected into the thigh muscles just as the anesthesia is begun. The operator assures himself that there is no loop of intestine between the uterus and abdominal wall, beneath the field of incision. Should a coil of intestine be found there, it is pushed above the fundus. An assistant holds the uterus in central position. The skin incision extends one-third above and two-thirds below the level of the umbilicus. It is best made through the right rectus muscle. The external layer of the rectus sheath is divided, the muscular bundles separated with handle of scalpel and the fingers, and the deep layer of the sheath and the peritoneum divided after lifting them with tissue forceps. Bleeding vessels are controlled by gauze sponge pressure or held by catch-forceps before opening the peritoneum. A short longitudinal median incision is made in the uterine wall beginning at the fundus, avoiding the membranes if still unbroken. This is extended downward with fingers, scissors, or scalpel to a total length of about 6 inches.

The hand is thrust through the membranes and the child is extracted by the head or the feet, whichever is most accessible. In case of anterior implanation of the placenta, usually the hand may best be passed directly through it. The cord is clamped at two points with catch-forceps, cut between them, and the child is passed to an assistant. The uterus slips out of the abdomen as the child is extracted, and the intestines are kept back with hot sterilized towels placed over the upper part of the incision. The coverings help also to protect the peritoneum from soiling. The uterus is wrapped in hot moist cloths. As a rule, it is better not to wholly eventrate the uterus. The placenta, if not spontaneously separated, may be peeled off by grasping it with one hand like a sponge. If the cervix is not sufficiently open for drainage, a large rubber tube or gauze strip is passed down through it and withdrawn from below. Irrigating or mopping the uterine cavity is unnecessary. Asepsis is promoted by leaving it as nearly as possible untouched. The peritoneum is sponged dry with the least possible friction or handling. The uterine wound is closed with deep No. 2 chromated catgut sutures at intervals of about 1/3 inch. They are given a wide sweep laterally through the muscular wall, falling short of the decidua. The peritoneal coat of the uterus is closed with a No. 1 continuous plain catgut suture, forming a welt over the deep suture line. The hemorrhage is inconsiderable and usually ceases with the introduction of the first sutures—a hypodermic of ergotole should be given before beginning the operation, and one of ergotole and pituitrin on the delivery of the child. Retraction of the uterus is ensured by manipulating it, if necessary, through a hot towel, or by faradism. When there has been much blood lost, a quart or two of warm sterilized 0.9 per cent. salt solution may be left in the peritoneum. The parietal peritoneum is closed with a plain running No. 0 catgut suture. Interrupted silkworm-gut sutures are then passed at intervals of about ¾ inch: through all but the peritoneum, from within outward. The fascia is brought together with interrupted No. 2 plain catgut sutures, or with a continuous suture. The silkworm-gut sutures are now tied. The abdomen is cleansed, and the wound covered with a dressing of several thicknesses of dry sterile cheesecloth; over this is placed a thick compress of sterile absorbent cotton. The dressings are secured with strips of zinc oxide adhesive plaster, and held in place by a Scultetus binder."—(Polak's *Obstetrics.*)

6. *Indications for the use of forceps* are: (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (a) Impending exhaustion; (b) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior, (*b*) mento-anterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage; prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both (Jewett). *Conditions necessary for the use of forceps* are: (1) The rectum and bladder must be empty; (2) the os uteri must be fully dilated; (3) the membranes must be ruptured; (4) the pelvis must be of sufficient size.

Contraindications: Mechanical obstruction in the parturient canal; incomplete dilatation of the os; non-rupture of membranes; non-engagement of the presenting part; the fetal head being too large or too small; distended bladder or rectum.

Manner of using forceps: "They should not be used when the os is undilated, when the head is not engaged, except in placenta prævia, when the membranes are unruptured, when the disproportion between the child's head and the parturient canal is too great, or in impossible positions and presentations. Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva; the tip is introduced into the vagina, and passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps.

In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the face is swept out under the symphysis pubis."—(*Pocket Cyclopedia.*)

7. *Hemorrhages of pregnancy:* Caused by (1) placenta prævia; (2) premature separation of a normally situated placenta; (3) apoplexy of the decidua or placenta.

Hemorrhages of labor: Caused by (1) placenta prævia; (2) premature separation of a normally situated placenta; (3) relaxation of the uterus; (4) laceration of cervix; (5) rupture or inversion of the uterus.

Hemorrhages of the puerperium: Caused by (1) retained secundines; (2) displaced uterus; (3) displaced thrombi; (4) fibroid tumors; (5) hypertrophied decidua; (6) carcinoma.

8. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment and may be near or over (partially or completely) the internal os. The *causes* are unknown; multiparity, frequent pregnancies with subinvolution, and abnormalities of uterus, placenta or cord are said to predispose to this condition. *Varieties:* (1) *Central*, when the placenta completely covers the os. (2) *Partial*, when the placenta overlaps the os. (3) *Marginal or lateral*, when the placenta reaches the margin of the os but does not overlap it. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Dangers:* Hemorrhage, sepsis, death of the mother, death of the fetus.

Treatment before term: Rest in bed, with or without a *tampon*, will arrest hemorrhage for the time; the sinuses are closed by thrombi, and the case may go on to term or another hemorrhage. The patient should be allowed cold drinks; opium may be used where pain is present. If the hemorrhage is great, it is safer to induce labor at once than to wait. Occasionally no hemorrhage occurs during pregnancy, not even in labor.

Treatment at term: (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the membranes, and if there is an unfavorable presentation, turn the child and make the breech engage in the os;

or, if the head presents, the forceps may be used, if speedy delivery is necessary. Stop the hemorrhage by a tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version and immediate extraction of the child.

9. *Diagnosis of position:* "The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contracting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and to confirm this fact the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet and, with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament into the pelvic cavity. If the head is presenting, it is felt as hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being often distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned."—(Hirst, *Obstetrics.*)

TOXICOLOGY.

1. A *poison* is a substance which, on being in solution in or acting chemically upon the blood, causes death or serious bodily harm. *Classification:* There are many classifications given, but not one of them is entirely satisfactory. That of Witthaus is into corrosives and poisons proper, the latter being subdivided into mineral poisons, vegetable poisons, animal poisons, and synthetic poisons.

2. *The symptoms of poisoning by opium:* At first there is usually a period of excitation, marked by restlessness, great physical activity, loquacity, and hallucinations. The patient then becomes weary, dull, and drowsy; he yields to the desire for sleep, from which at first he may be roused. The lips are livid, the face

pale, the pupils contracted, and the surface bathed in perspiration. The condition of somnolence rapidly passes into narcosis. The patient cannot be roused, and lies motionless and senseless, with completely relaxed muscles. The pulse, at first full and strong, becomes feeble, slow, irregular, and easily compressible; the respiration slow, shallow, stertorous, and accompanied by mucous râles. The patient rapidly becomes comatose, and, in fatal cases, dies in from 45 minutes to 56 hours, usually in from 12 to 18 hours. In cases of recovery after the stage of narcosis, the pulse and respiration gradually return to the normal, and the condition of coma passes into one of deep sleep, lasting 24 to 36 hours.

3. *Carbolic acid poisoning may be produced* by ingestion of phenol or its derivatives, by the application of phenol dressings, by intrauterine douche of phenol, by vaginal douche of phenol, by using lotions containing phenol. *Symptoms of carbolic acid poisoning:* Buccal mucous membrane is whitened and hardened; vomiting; burning pain in mouth, esophagus, and stomach; pulse and body temperature are lowered; the pupils are contracted; collapse, and finally death. The urine may become dark.

4. *Bromism* is the name given to certain peculiar phenomena produced by the excessive administration of the bromides. The most marked symptoms are headache, coldness of the extremities, feebleness of the heart's action, somnolence, apathy, anesthesia of the soft palate and pharynx, pallor of the skin, and a peculiar eruption of acne that, with lowered faucial sensibility, is one of the earliest and most constant symptoms. There is also anrexia, with loss of sexual power and atrophy of the testes or mammæ. The patient may become almost imbecile.

5. *Symptoms of poisoning by tartar emetic:* "These are seldom delayed more than half an hour. Nausea, violent and continual vomiting, burning pain in stomach and bowels, with an acrid, burning sensation in the throat, are usually the first symptoms. Then purging, intense thirst, feeble, rapid pulse, cramps in legs, and general lowering of the temperature, with great prostration, follow. The coldness extends even to the internal organs. The bowels become tympanitic. The spinal centers are greatly depressed. The urine is generally increased, but sometimes diminished or suppressed, and may be bloody and passed with difficulty and pain. Delirium and convulsions may precede death, or the patient may sink into coma, or die from

exhaustion. The progress of the case often resembles arsenical poisoning so closely that it is difficult to decide which it is without chemical analysis. Generally, however, the persistent nausea and vomiting will distinguish between them. Sometimes neither vomiting nor purging is seen. In such cases the patient is apt to collapse, with cold sweat, feeble respiration, cyanosis, delirium, irregular pulse, and lapse into unconsciousness and die in convulsions.—(Riley's *Toxicology.*)

6. *Acute ergotism:* "In a large dose ergot acts as a gastrointestinal irritant, causing nausea and vomiting, gastralgia, colic, thirst, and purging. It slows the heart, raises the arterial tension greatly, dilates the pupils and produces pallor, vertigo and frontal headache. It stimulates the contraction of unstriped muscular fiber, especially affecting the sphincters and causing contraction of the sphincter of the bladder, making micturition difficult if not impossible. It produces cerebral and spinal anemia, a great fall of the body temperature, coldness of the surface, tetanic spasms, and violent convulsions." *Chronic ergotism* "occurs in two forms, the convulsive and the gangrenous —either usually excluding the other. The convulsions are tetanoid spasms of the flexor muscles, the uterus, the intestinal fibers, and the muscles of respiration, ending in coma and death by asphyxia. The gangrenous form begins with coldness and numbness of the limbs, formication of the skin all over the body, loss of sensibility and abolishment of the special senses, bullæ of blood and ichor, followed by dry or moist gangrene of the lower extremities, buttocks, and other parts, epileptiform, convulsions, coma, and death. Autopsies show changes in the posterior columns of the cord, resulting probably from spinal anemia."—(Potter's *Materia Medica*, etc.)

7. *Five common vegetable poisons:* Aconite, belladonna, strychnine, cocaine, and opium. Chloral hydrate is antidotal to the spasms caused by strychnine.

8. *Hydrargyrism.* The first symptoms of salivation are fetid breath, swollen and spongy gums, having a bluish line along their margins, stomatitis, sore and loosened teeth, inflamed and tender salivary glands pouring out a peculiar, thin saliva of foul odor in large quantity, and a metallic taste in the mouth. Emaciation, pallor, edema, ulcerated skin, erythematous, vesicular, or pustular eruptions, headache, insomnia, neuralgia, tremor through paresis of the muscles of the head and extremities, epilepsy, coma, and convulsions may ensue. An influenzal condition is not uncommon.

9. *Strychnine* produces a sense of suffocation, thirst, tetanic spasms, usually opisthotonos, sometimes emprosthotonos, occasionally vomiting, contraction of the pupils during the spasms, and death, either by asphyxia during a paroxysm, or by exhaustion during a remission. The symptoms appear in from a few minutes to an hour after taking the poison, usually in less than twenty minutes; and death in from five minutes to six hours, usually within two hours.

10. *Symptoms of digitalis poisoning:* Nausea and occasionally vomiting. Sometimes colic and diarrhea. After two or three hours marked diminution in the frequency of the pulse, which may fall to 40 or even 25. Dyspnea, attended by a sense of oppression in the chest and coldness of the extremities. Headache, vertigo, and tendency to sleep. Usually attacks of syncope occur, provoked sometimes by the slightest movement of the patient.

SURGERY.

1. The *thyroid gland* is subject to atrophy, hypertrophy, inflammation, goitre (which may be benign, cystic, exophthalmic, parenchymatous, adenomatous, fibrous, and malignant); myxedema and cretinism are also conditions in which the thyroid gland is affected. In *goitre*, the gland is swollen, and moves on deglutition; there may be dyspnea from pressure on the surrounding parts or from pressure on the recurrent laryngeal nerve. *Exophthalmic goitre* is believed to be due to excessive absorption of the thyroid secretion, or to some nervous derangement; it is characterized by exophthalmos, goitre, rapid heart beat, and fine tremors. Removal of the thyroid without the parathyroids is usually not fatal, but myxedema may result.

2. Benign tumors of the breast are fibroma, adenoma, cystadenoma, lipoma, myxoma, and enchondroma. It is generally believed that benign tumors may become malignant. The malignant tumors are sarcoma, and carcinoma. It is of the utmost importance that the presence of a tumor be recognized at an early date, and in case of doubt as to the character of a tumor it should be considered malignant until it is proved to be otherwise. "If the mistake is made of regarding an innocent tumor as malignant the woman loses her breast. If a malignant tumor is regarded as innocent, the woman loses her life." Benign tumors should be removed; malignant, if operable, require entire removal of the breast and neighboring lymphatics. Besides tumors, the breast may be the seat of inflammation, abscess, cysts and hypertrophy. In *chronic inflammatory thick-*

ening the skin may be pitted, and the tumor fixed in the breast, and ill-defined; but the whole gland is often uniformly enlarged, scars of old abscesses may be visible, and the glands are swollen at an earlier stage, and to greater size than in cancerous conditions. *Adenomata* are generally clearly limited and freely movable; there is no dimpling of the skin, and the lymphatic glands are not enlarged. *Tense cysts*, when fluctuation cannot be elicited, are similar in most of their symptoms to adenomata; and differ from "malignant cysts" by the absence of adhesions or extension of the disease to lymphatics. *Sarcomata* are more rapid in growth and soon involve the skin, and do not affect the glands in the early stages. *Duct cancers* are apt to be multiple, are more circumscribed, and are specially distinguished from scirrhus by the bloody discharge from the nipple; they differ also from simple papilliferous cysts of the ducts by the tumor invading the breast. *Epithelioma* of the areola or nipple differs from eczema in its intractability to soothing treatment; and from scirrhus in its superficial and more localized situation, at all events in the early stages. In cases of *doubtful* diagnosis it is advisable to prepare for a radical extirpation of the disease; but first to incise the tumor and *remove a piece* from the growing edge for immediate examination.

3. *Varieties of intestinal obstruction* are: (1) Acute, including strangulation, Volvulus, and Intussusception; and (2) Chronic. (See table on page 159.)

4. *Pott's fracture* is very common, and is due to indirect violence, such as turning over on the inside of the foot. The strain tears through the internal lateral ligament of the ankle or tears off the tip of the malleolus; then the astragalus is pressed against the inner side of the external malleolus by the continuation of the violence. The fibula is overbent, and breaks about 3 inches above the tip of the malleolus. At the same time the foot is displaced outwards or outwards and backwards. *Treatment:* An anesthetic should always be given, and the fracture reduced by relaxing the calf muscles and applying traction to the foot. The limb must then be fixed on a back-splint, with side-splints in addition. The foot must be at right angles to the leg, the bony points in line, and the posterior displacement corrected. The surest way of maintaining the foot in good position is to at once apply plaster of Paris. Other splints used are Dupuytren's and Syme's horseshoe splint. Massage and passive movement at the end of ten days are advisable, the fragments being firmly

DIAGNOSTIC TABLE OF THE VARIETIES OF INTESTINAL OBSTRUCTION

Strangulation	Intussusception.	Twists (Volvulus).	Chronic Intestinal Obstruction.
Subjective Symptoms.	*Subjective Symptoms.*	*Subjective Symptoms.*	*Subjective Symptoms.*
1. Generally occurs after age of 20.	1. Most frequent in childhood.	1. Most frequent after age of 30.	1. Middle life.
2. Pain localized, rapid collapse.	2. Constant tenesmus.	2. Pain diffuse.	2. Pain diffuse, but comes on gradually.
3. Pain intense, paroxysmal in character.	3. Pain develops suddenly and is continuous.	3. Pain paroxysmal; recurs less often than in strangulation.	3. Pain continuous.
4. Constipation complete.	4. Frequent diarrhea, passage of bloody mucus.	4. Constipation complete.	4. Constipation complete.
Objective Symptoms.	*Objective Symptoms.*	*Objective Symptoms.*	*Objective Symptoms.*
1. Temperature often subnormal.	1. Temperature normal or subnormal.	1. Temperature slightly elevated.	1. Temperature moderate; frequently high.
2. Pulse very weak.	2. Same as in strangulation.	2. Same as in strangulation.	2. Pulse of good volume.
3. Stercoraceous vomiting comes on early.	3. Same as in strangulation.	3. Same as in strangulation.	3. Stercoraceous vomiting comes on after first few days.
4. Location in small intestine.	4. Localization in small intestine; bowel frequently protrudes at rectum.	4. Location, small intestine, abdomen often protrudes, in certain areas giving dulness on percussion.	4. Location in large intestine; dulness on percussion.

grasped to prevent displacement.—(*Aids to Surgery.*)

5. In *fracture of the surgical neck of the humerus*, the head of the humerus will be found in the glenoid cavity, but it will not rotate with the shaft; the arm will appear shorter; and crepitus and abnormal mobility will be elicited unless there is impaction.

In *dislocation of the shoulder joint*, the glenoid cavity will be empty, and the head of the bone will be found in an abnormal position; the arm will appear longer; there will be no crepitus, and no abnormal mobilty.

The *various dislocations of the shoulder joint* are: (1) Subcoracoid—forward, inward, and downward. (2) Subglenoid—downward, forward, and inward. (3) Subspinous—backward, inward, and downward. (4) Subclavicular—forward, inward, and upward.

The *special diagnostic signs* are: (1) *Subcoracoid:* The head of the humerus is felt below the outer end of the clavicle; there is little or no shortening of the limb; the elbow is directed outward and backward.

(2) *Subglenoid:* The head of the humerus can be felt in the axilla; the arm is decidedly lengthened; the elbow is flexed, and there are signs of pressure on vessels and nerves.

(3) *Subspinous:* The head of the humerus is felt below the acromion process and behind; the arm is rotated inward, and the elbow is displaced outward.

(4) *Subclavicular:* The head of the humerus is felt below the clavicle; the elbow is far from the side; and the limb may be shortened.

6. *Hernia* is the protrusion of a viscus or other structure, either in whole or in part, through the cavity in which it is normally placed.

Varieties of abdominal hernia: Inguinal (oblique and direct; the oblique may be congenital, acquired, or infantile); femoral; umbilical; ventral, and postoperative.

The forms of inguinal hernia are:

(1) *The Direct*, in which the hernia does not occupy the inguinal canal, but leaves the abdomen to the inner side of the deep epigastric artery, through the space known as Hesselbach's triangle. There are two forms of this variety: (*a*) the hernia may escape between the epigastric artery and the obliterated hypogastric artery; (*b*) or it may escape between the obliterated hypogastric artery and the outer edge of the rectus muscle.

(2) *The Indirect* or *Oblique*, in which the hernia occupies, wholly or in part, the inguinal canal. An *oblique inguinal* hernia may pass into the scrotum or labium majus, when it is called *complete;* or may be retained

in the inguinal canal, when it is called *incomplete*, or a *bubonocele*.

Femoral hernia is always *acquired*, and has a sac. Its course is first vertical, then forward, then upward over Poupart's ligament. Its coverings, from without inward, are: Skin, superficial fascia, cribriform fascia, crural sheath, septum crurale, subserous tissue, and peritoneum. The neck of the hernia is situated at the femoral ring; to its outer side lies the femoral vein, and to its inner side is Gimbernat's ligament; in front of it is Poupart's ligament, and behind it are the pubis, the pectineus, and the pubic portion of the fascia lata. In the immediate neighborhood of the femoral ring are: Anteriorly, the communicating branch between the deep epigastric and the obturator arteries; externally, the femoral vein and deep epigastric vessels; superiorly, the spermatic cord or round ligament) and the deep epigastric vessels.

7. "The *symptoms of sapremia* seldom manifest themselves within twenty-four hours of an operation or injury, because it takes some time for the bacteria to produce a sufficient dose of their poisons. The onset of the condition is marked by a feeling of chilliness, sometimes amounting to a rigor, and a rise of temperature to 102°, 103°, or 104° F., with slight morning remissions. The heart's action is markedly depressed, and the pulse is soft and compressible. The appetite is lost, the tongue dry and covered with a thin, brownish-red fur, so that it has the appearance of 'dried beef.' The urine is scanty and loaded with urates. In severe cases diarrhea and vomiting of dark coffee-ground material are often prominent features. Death is usually impending when the skin becomes cold and clammy, the mucous membranes livid, the pulse feeble and fluttering, the discharges involuntary, and when a low form of muttering delirium is present. A local focus of septic infection is always present—it may be an abscess, a septic compound fracture, or a septic infection of the cavity of the uterus, for example, from a retained portion of placenta."—(Thomson and Miles' *Manual of Surgery.*) *Differential diagnosis:* In *Sapremia* there is an inflamed wound or local focus of infection, and the local signs are in proportion to the constitutional signs; and the symptoms improve when the infective focus is freely opened. In *pyemia* there are repeated rigors, intermittent fever, and local abscesses. In *septicemia*, opening and draining of the wound makes no improvement in the condition.

8. *Hemorrhages from the stomach* may be due to rup-

ture of an aneurysm into the esophagus, or stomach, to gastric ulcer, to a large spleen, and to cirrhosis of the liver. Hematemesis is to be distinguished from hemoptysis as follows:

Hematemesis.	Hemoptysis.
1. Previous history of gastric, hepatic, or splenic disease.	1. Previous history of pulmonary troubles.
2. Blood is vomited.	2. Blood is coughed up.
3. Blood is dark colored and not frothy.	3. Blood is frothy and bright red.
4. Blood may be mixed with food.	4. Blood may be mixed with sputa.
5. Giddiness or faintness usually precedes vomiting.	5. Sensation of tickling in the throat usually precedes.
6. Nausea and weight in episgastrium.	6. Dyspnea and pains in the chest.
7. Often followed by melena (black, tarry stools).	7. Is not usually succeeded by melena.

(Hughes' *Practice of Medicine.*)

Other causes of hematemesis are: Traumatism; gastric cancer; chronic heart disease; acute gastritis; blood dyscrasia, as in scurvy, purpura, severe infections, and grave anemias; rupture of aneurysm; swallowing of blood from nose, mouth, or throat; vicarious menstruation; hysteria.

Intestinal hemorrhage may be due to gastric ulcer, or cancer, ulcers of the intestine, portal obstruction, cirrhosis or cancer of the liver, purpura, anemia, cancer of rectum, annal fissure, hemorrhoids, dysentery, proctitis, rupture of an aneurysm into the alimentary canal, colitis, and typhoid fever.

9. *Cerebral hemorrhage.*—"Primary effects are tearing and compression of the brain-substance. If the patient does not immediately die, softening occurs. As a result of the staining by the retained hemoglobin the area is known as red softening. Shortly after the blood escapes it undergoes coagulation, forming a cerebral hematoma. This acts as a foreign body and sets up an inflammatory reaction, with more or less hyperplasia of the surrounding neuroglia. The fluid portion finally becomes absorbed, the corpuscles broken down, and the pigment liberated, which stains the walls of the cavity.

Occasionally a cyst filled with a clear fluid may form. If all fluids are absorbed, the walls of the cavity may come in contact and a scar result. Other primary effects are distant ones in the form of paralysis, both motor and sensory, and generally on the side of the body opposite to the seat of the hemorrhage. Although there may be a considerable return of the lost faculties, yet in a majority of cases permanent damage is done. This is due to the secondary effects—the secondary degenerations. These are systemic, and follow the direction of the nerve impulses. The commonest degeneration is one of the pyramidal tracts. The optic tract and fibers from the temporosphenoidal area may also be involved. In the brain there is finally loss of nerve-cells, without destruction of the neurogliar fibers. As a result of traumatism, hemorrhages may take place in any part of the brain, with or without fracture of the skull. The hemorrhage may be found on the side of the head opposite to that where the blow was received."—(McConnell's *Pathology*.)

10. The case may be one of appendicitis, intestinal colic, or intestinal obstruction. In *appendicitis* there will be, further, rigidity of the right rectus muscle; in *intestinal colic* there is no rigidity, and the pain is relieved by pressure; in *intestinal obstruction* the vomiting is persistent, and soon becomes fecal, the temperature is normal, and shock and collapse soon appear.

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF CONNECTICUT.

ANATOMY AND HISTOLOGY.

1. Describe the elbow joint.
2. Describe the minute anatomy of the pancreas.
3. Give the attachments, action, and nerve supply of the following muscles—digastric, biceps femoris, soleus, gastrocnemius.
4. Describe the occipital bone.
5. Give the anatomical relations of the axillary artery.
6. Describe and give the relations of the prostate gland.
7. Describe the minute anatomy of the female breast.
8. Describe the origin, course, and distribution of the internal mammary artery.
9. Describe the course and distribution of the musculo-spiral nerve.
10. Give anatomical relations of the common bile duct.

MEDICAL RECORD.

PHYSIOLOGY.

1. Discuss the functions of the cerebellum.
2. What important centers are located in the medulla oblongata?
3. How does the eye accommodate for objects at different distances?
4. Name the substances necessary for the formation of fibrin in blood clot. From what substances are they derived?
5. How is the flow of venous blood to the heart influenced by inspiration? Why does the flow of blood in the arteries remain unaffected?
6. Discuss the function of the parathyroid glands.
7. (*a*) How do smooth muscle fibers differ from striated muscle fibers in their reaction to stimuli? (*b*) Under normal conditions what chemical changes occur in the muscle as a result of contraction?
8. Discuss the exchange of oxygen and carbon dioxide in the tissues.
9. Name three enzymes that act on carbohydrates.
10. Where is trypsin formed? On which group of foods does it act?

MATERIA MEDICA AND THERAPEUTICS.

1. Discuss the treatment of hemorrhagic disease of the new born.
2. (*a*) Name the drugs used to cause an increase in the flow of urine. (*b*) Discuss the use of diuretics in acute nephritis.
3. Discuss the treatment of summer diarrhea in infants. State the dose of any drug you might use.
4. Name the preparations of mercury used in the treatment of syphilis, stating the dose and method of administration of each.
5. What are the symptoms and signs of mercurialism?
6. (*a*) What are the chemical properties of chloral hydrate? (*b*) What effect has it on (1) the central nervous system; (2) the heart? (*c*) What is the usual dose for an adult?
7. Write a prescription containing two bitter tonics commonly used to increase gastric secretion.
8. What are the symptoms and signs of digitalis poisoning, following prolonged therapeutic doses of the drug?
9. Name the three most important drugs of the digitalis group.
10. What drugs would you use for the immediate

relief of an acute attack of asthma? State the dose and method of administration of each drug.

HYGIENE AND MEDICAL CHEMISTRY.

1. State the reasons that tend to create military inefficiency, "in the field," in a body of men not physically fit when mustered in.

2 and 3. What precautions should one use in selecting a recruit? (State minutely.)

4. What fabrics are warm for cold and windy weather? State reasons.

5. What are the conditions that a military hygienist should consider in the selection of a camp site?

6 and 7. State how you would arrange for the housing of a thousand men in a camp of instruction, there being only unmatched lumber and soldier labor. The camp is in this latitude and the season March.

8 and 9. As a sanitary inspector what recommendations would you make to prevent the spread of the following diseases? (*a*) Typhoid, (*b*) typhus, (*c*) yellow fever, (*d*) malaria, (*e*) syphilis.

10. (*a*) Is there any way by which the ordinary soldier can distinguish good from dangerous water? (*b*) What means are commonly at his disposal by which he can render germ laden water safe? (*c*) What chemical means of rendering this dangerous water potable is at the disposal of the hygienist?

PRACTICE AND PATHOLOGY.

1. Name and give the prognosis and treatment of three of the most serious complications of scarlet fever.

2. Give the differential diagnosis between acute miliary tuberculosis and typhoid fever when tubercle bacilli are not found and Widal reaction not yet developed.

3. Describe the symptoms and physical signs of lobar pneumonia in the order of their development.

4. Give the symptoms and signs of a rather slowly developing lead poisoning.

5. Describe fully the signs in the second stage (effusion) of acute pleurisy.

6. Why do not all persons exposed to irritant pollen develop hay fever?

7. Describe the morbid anatomy of the several stages through which untreated chronic gastritis is inclined to pass.

8. Describe your treatment of a moderately severe case of lobar pneumonia in an adult having chronic nephritis.

9. How would you modify your treatment of the pneumonia in a case of arrested tuberculosis?

10. How would you treat the pneumonia in an infant of four years—giving your exact dosage and remedies?

OBSTETRICS AND GYNECOLOGY.

1. Give the clinical history, diagnosis, and management of a typical case of toxemia of pregnancy in the last few weeks.
2. Describe the normal mechanism of labor in a head presentation, occiput to the rear.
3. What are the indications for cesarean section? What are the limits of contraction in the absolute indication?
4. Give the full treatment for prolapsed cord.
5. What are the indications for the induction of premature labor? Describe a method.
6. Give the indications and contra-indications for ventral suspension or ventral fixation of the uterus.
7. Define cystocele. Give the etiology and treatment.
8. Give the diagnosis, pathology and clinical history of carcinoma of the body of the uterus.
9. Give an etiological classification of dysmenorrhea.
10. Give in full the etiology and treatment of ulcer of the cervix uteri.

SURGERY.

1 and 2. Tetanus—(*a*) Describe the germ causing it and its manner of growth. (*b*) Where are the germs chiefly found in nature? (*c*) What is the time of incubation in tetanus? (*d*) What is the prevention? (*e*) Describe the treatment.
3. (*a*) What are the causative organisms in gas producing infections? (*b*) Where are gas infections chiefly found and the reason for this? (*c*) What is the treatment?
4. (*a*) What are the symptoms of acute appendicitis? (*b*) What other conditions not infrequently simulate this disease?
5. State the advantages and disadvantages of the McBurney and the vertical semilunar incisions for appendicitis.
6. State the treatment for a recent fracture of the nose.
7. What are the symptoms of a fracture at the base of the skull?
8. (*a*) Case of thoracic empyema—Pulse for a week running 90 to 120; temperature for a week running 100 to 103; respirations for a week running 24 to 40; heart's action progressively worse; patient very weak. (*b*) Case of thoracic empyema three days' duration—

Pulse 80 to 110; temperature 100 to 102; respirations 24 to 30; heart displaced, but strong and regular in action. Describe fully your surgical treatment in each case.

9. (*a*) Describe the treatment of a fracture of both bones of the forearm near the middle. (*b*) Give reasons for this rather than some other form of treatment.

10. What are the essentials in the treatment of a fractured clavicle?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS, STATE OF CONNECTICUT.

ANATOMY AND HISTOLOGY.

1. The *elbow-joint* "is a ginglymoid articulation formed above by the lower extremity of humerus, below by upper extremities of ulna and radius. Its ligaments are external and internal lateral, anterior and posterior ligaments. *External lateral* arises from external condyle of humerus and is inserted into outer margin of ulna. *Internal lateral*, much stronger, consists of two portions; *anterior* arises from fore part of internal condyle to be inserted into coronoid process, and *posterior* from back part of condyle to inner margin of olecranon. *Anterior* ligament arises above coronoid fossa, and is inserted into coronoid process of ulna and orbicular ligament. *Posterior ligament*, attached above olecranon fossa, and below to olecranon process of ulna. The anterior and posterior ligaments become continuous with the lateral to encircle the joint."—(Young's *Anatomy*.)

2. *Minute anatomy of the pancreas:* "The *pancreas* consists for the most part of long tubular acini of columnar or polygonal epithelial cells, supported by very loose fibrous tisue. The cells are of the serum-secreting type. Their inner portion shows granules; the outer part is clearer, and sometimes striped. The pancreas has, therefore, a general resemblance to the parotid gland, but differs from it in two respects: (1) The intralobular ducts are lined by flat epithelium, and are inconspicuous; (2) between the acini here and there are islands of epithelial cells without any glandular arrangement. These are the *islets of Langerhans*. In some of the acini, close to the lumen, stellate cells can be seen. These are the *centroacinar cells of Langerhans*, and are probably continued into the acini from

the small ducts. There are spaces between the cells continuous with the lumen of the acini. The larger ducts are lined with columnar epithelium, with a few goblet cells here and there, and the largest ducts have a ring of non-striped muscles in the fibrous wall. Numerous nerve fibers with nerve cells in their course run through the pancreas and end among the cells. Some of them may terminate in Pacinian corpuscles."—(*Aids to Histology.*)

3. DIGASTRIC. *Origin:* Groove on internal surface of mastoid process, and from posterior surface of body of inferior maxilla, near the symphysis. *Insertion:* Tendon attached to hyoid bone by a process of the deep cervical fascia. *Action:* It depresses the lower jaw and raises the hyoid bone. *Nerve supply:* Mylohyoid branch of inferior dental nerve and facial nerve.

BICEPS FEMORIS. *Origin:* Tuberosity of the ischium, great sacrosciatic ligament, outer lip of linea aspera of femur, upper part of line to external condyle, and intermuscular septum. *Insertion:* Outer side of head of fibula, by two slips. *Action:* Flexes knee, extends thigh, and rotates leg outward. *Nerve supply:* Great sciatic.

SOLEUS. *Origin:* Posterior surface of head of fibula and upper part of posterior surface of shaft of fibula, and oblique line and middle part of internal border of tibia. *Insertion:* By tendo Achillis into posterior part of os calcis. *Action:* It extends the ankle. *Nerve Supply:* Internal popliteal and posterior tibial.

GASTROCNEMIUS. *Origin:* Posterior part of inner condyle of femur and line above it, and posterior part of outer condyle. *Insertion:* By tendo Achillis into posterior surface of os calcis. *Action:* It flexes the knee and extends the ankle. *Nerve supply:* Internal popliteal.

4. The *occipital bone* forms the posterior inferior portion of the cranium. It presents two surfaces, four angles, and four borders. The external and posterior surface is irregularly convex and presents: The occipital protuberance for insertion of ligamentum nuchæ, and descending from which to the foramen magnum is the occipital crest; on either side, above and below are the superior and inferior curved lines for the attachment of muscles. In front it presents a large aperture, the *foramen magnum*, transmitting the medulla oblongata and its coverings, the vertebral arteries, and the spinal accessory nerves. A little in front and on either side of the foramen magnum are the condyles for articulation with the atlas, the inner border of each

condyle presenting a *tubercle* for the check ligament. Externally to each condyle are the *jugular processes*. In front of the foramen magnum is the *basilar process*, articulating with the sphenoid bone, and grooved on its under surface by the *pharyngeal spine* for the insertion of the tendinous raphé and superior constrictor of the pharynx. The *internal surface* is irregularly concave and divided by a *crucial ridge*, into four fossæ, the upper, for the posterior lobes of the cerebrum, and the lower, for the lateral lobes of the cerebellum. Its center is marked by an eminence, the *internal occipital protuberance*, which is hollowed out to correspond to the *torcular Herophili*. The upper division of the crucial ridge affords attachment for the falx cerebri, being grooved for the great longitudinal sinus; the lower extremity affords attachment for the falx cerebelli, being grooved for the occipital sinus; and the lateral divisions afford attachment for the tentorium cerebelli and are grooved for the lateral sinuses. In front of the foramen magnum is the basilar groove, lodging the medulla oblongata and part of the pons Varolii. The *superior angle* articulates with the parietal bones, the *inferior angle* articulates with the sphenoid, and the *lateral angles* are wedged in between the mastoid portion of the temporal and the posterior inferior angle of the parietal.—(Young's *Anatomy.*)

5. RELATIONS OF AXILLARY ARTERY. *In front:* Skin; fascia; pectoralis major and minor; costo-coracoid membrane; external anterior thoracic, inner head of median and internal cutaneous nerves; cephalic and acromiothoracic veins. *Behind:* First intercostal, serratus magnus, subscapularis, and tendons of latissimus dorsi and teres major muscles; posterior thoracic, internal anterior thoracic, musculospiral, and circumflex nerves, also posterior cord of brachial plexus. *Outer side:* Coracobrachialis; brachial plexus, and median and musculocutaneous nerves. *Inner side:* Axillary vein; ulnar, lesser internal cutaneous, and internal anterior thoracic nerves, and inner cord of brachial plexus.

6. *Prostate gland* is about 1½ x ¾ x ½ inches, and weighs about three-quarters of an ounce. It resembles a chestnut in size and form. It is situated at the neck of the bladder, and surrounds the first part of the urethra. It consists of fibromuscular (unstriated) tissue with imbedded follicular pouches, the whole enclosed in a firm fibrous capsular continuous in front with the triangular ligament, and behind with the posterior layer of the deep perineal fascia. The gland consists

of three lobes, two lateral and one middle, and is perforated from base to apex by the urethra. The common seminal ducts open into the prostatic portion of the urethra, and are placed between the middle and lateral lobes.

RELATIONS. *Anteriorly:* Symphysis pubis, anterior ligaments of bladder, branches of dorsal vein of penis. *Posteriorly:* Rectum. *Laterally:* Levator ani. *Base:* Surrounds neck of bladder, seminal vesicles, and vasa deferentia. The *apex* rests on triangular ligament.

7. "The mammary gland is a multiple alveolo-tubular organ. It is composed of from fifteen to twenty individual compound glands. Each of these possesses its own excretory duct, that has its own opening in the nipple. The entire organ is covered by skin. Each gland consists of lobes and lobules separated and supported by white fibrous and adipose tissues. All of the individual glands are further bound together in the same manner. The ducts converge and end in the nipple, which forms a small projecting mass. Each lobule consists of a number of acini which are tubular or alveolar in structure. The number of these depends upon the state of activity. In the gland of pregnancy, the acini are very numerous, and are lined by simple columnar or cuboidal cells, in which are accumulated the fat globules that form the important constituent of the milk. These cells rest upon a basement membrane, but in places are separated therefrom by peculiar elements called basket cells, which are compared to the smooth muscle tissue of the sweat glands. The ducts are lined by simple columnar cells which rest upon a basement membrane, outside of which circular bundles of white fibrous tissue are to be found. These ducts unite to form the main secretory duct of the individual glands; each main duct dilates to form a small ampulla or sinus lactiferus, before the nipple is reached."—(Radasch's *Compend of Histology.*)

8. The *internal mammary artery* arises from the under surface of the first part of the subclavian; it passes downward behind the clavicle and the subclavian vein to the posterior surface of the first costal cartilage, then between the pleura and the costal cartilages as far as the sixth space; it lies on the triangularis sterni muscle, and at the sixth space it divides into its two terminal branches, the musculophrenic and superior epigastric. Its other branches are the cornes nervi phrenici, mediastinal, pericardiac, sternal, anterior intercostal and perforating. It is distributed to the diaphragm, anterior mediastinum, thymus, pericardium,

triangularis sterni, sternum, intercostal spaces, pectoral muscles, mammary gland, and rectus abdominis muscle.

9. The *musculospiral nerve* is derived from the posterior cord of the brachial plexus, and originates from the sixth, seventh, and eighth cranial nerves. At first it is behind the axillary and brachial arteries; it winds around the humerus in the musculospiral groove with the superior profunda artery; it pierces the triceps muscle. At the elbow joint it divides into the radial and posterior interosseous nerves. It supplies the triceps, anconeus, supinator longus, brachialis anticus, and extensor carpi radialis longi muscles.

10. The *common bile duct* passes along the right border of the lesser omentum, behind the first part of the duodenum, in front of the portal vein and to the right of the hepatic artery; it then passes between the pancreas and duodenum, in front of the inferior vena cava, and enters the small intestine by an opening common to it and the pancreatic duct.

PHYSIOLOGY.

1. *Functions of the cerebellum.* "When the normal impulses from the cerebellum are wanting, there is defective coordination of muscular movements as well as defective muscle tone. As a result, the power of maintaining the equilibrium of the body is impaired and the gait is staggering, though consciousness and volition are not affected. Further, observation of the results of localized lesions shows that different areas of the cerebellar cortex are associated with different groups of muscles, although no histological difference can be detected in the various parts of the cerebellar cortex. The cerebellum is, therefore, a reflex center for the maintenance of muscle tone and for the coordination of muscular movements. It is especially concerned with the maintenance of the position of the body in relation to gravity, and with coordination of the body as a whole."—(Bainbridge and Menzies's *Essentials of Physiology.*)

2. *Centers located in the medulla oblongata* are those for respiration, salivary secretion, mastication, sucking, deglutition, vomiting, voice, facial expression; it also contains the cardiac and vasomotor centers.

3. *Mechanism of accommodation.* "The lens is an elastic structure, and when released from the flattening influence of its suspensory ligament tends to assume a spherical shape. During accommodation the ciliary muscle (especially the circular fibers) contracts, drawing forward the choroid and relaxing the suspensory

ligament; this diminishes the tension of the lens capsule and allows the inherent elasticity of the lens to increase its convexity. The change in curvature affects chiefly the anterior surface of the lens. This is Helmholtz's theory and the one usually accepted. Lately Tscherning has advanced a different theory; he maintains that the ciliary muscle increases the tension of the suspensory ligament during contraction and that this causes peripheral flattening of the lens with bulging anteriorly at its center. The act of accommodation is accompanied by contraction of the pupil, and (in binocular vision) by convergence of the visual lines."—(May's *Diseases of the Eye.*)

4. The formation of fibrin in the process of blood clotting is due to the interaction of fibrinogen and thrombin. Thrombin is derived from thrombogen by the action on the latter of salts of calcium.

5. During inspiration the venous flow to the heart is assisted by the aspiratory action of the thorax; the negative pressure in the thorax becomes more negative and the venous blood is drawn into the thorax and toward the heart. This negative pressure hardly affects the aorta, and so the flow in the arteries is not affected.

6. *Removal of all the parathyroids* causes death from acute tetany. Their exact function is unknown, but it is supposed that some of the evil effects attributed to removal of the thyroids is really due to the removal of all the parathyroids as well, and that if the parathyroids are left (with their blood supply intact) these results will not ensue. The parathyroids are also concerned in the calcium metabolism of the body.

7. The contractions in *non-straited, involuntary muscles* are not under the control of the will; they are rhythmical, and are characterized by peristalsis. Example, the muscles in the walls of the intestines. In *striated, voluntary muscles,* the contractions are largely under the control of the will, are not rhythmical, and are not characterized by peristalsis. Example, the flexor muscles of the forearm.

When a muscle is in a state of activity: (1) It becomes shorter and thicker, but (2) there is no change in volume; (3) there is an increased consumption of oxygen; (4) more carbon dioxide is set free; (5) sarcolactic acid is produced; and hence (6) the muscle becomes acid in reaction; (7) it becomes more extensible, and (8) less elastic; (9) there is an increase in heat production and consequently a rise of temperature; (10) the electrical reaction becomes relatively negative; and (11) a sound is produced.

8. "Oxygen passes from the blood to the tissues by diffusion, and the amount which is available for the tissues depends largely upon the extent to which oxygen is set free in the plasma by the dissociation of oxyhemoglobin. If the tension in the tissues were zero, as was formerly supposed, the conditions during the passage of blood through the capillaries would be the same as if it were exposed to a vacuum, and the dissociation of oxyhemoglobin would be almost complete. Recent observations have shown, however, that the actual tension of oxygen in the tissues varies from 10 to 40 mm. of mercury, being highest in the glandular tissues and least in the muscles; this tension is so low that, as the blood traverses the capillaries, its oxyhemoglobin undergoes dissociation to a considerable extent. The oxygen thus set free passes into solution in the blood plasma and diffuses into the tissues. Further the rate at which oxyhemoglobin dissociates at this tension is increased by the addition to the blood of carbonic acid, and often of lactic acid, as it passes through the capillaries. In addition to these two factors, the amount of oxygen available for the use of the tissues depends upon the rate at which the blood is flowing through the capillaries. Carbonic acid also passes by diffusion from the tissues, in which its tension is high, into the plasma, in which its tension is much lower. The tension of carbonic acid in the tissues is ascertained indirectly by measuring its tension in bile or urine, and is about 8 or 9 per cent. of an atmosphere, whereas its tension in blood is only 5 to 6 per cent. of an atmosphere."—(Bainbridge and Menzies's *Essentials of Physiology*.)

9. *Three enzymes that act on carbohydrates:* Ptyalin, amylopsin, and maltase.

10. *Trypsin* is formed in the pancreatic juice; it acts on proteins.

MATERIA MEDICA AND THERAPEUTICS.

1. *Treatment of hemorrhagic disease of the newborn.* "By far the most satisfactory method of treatment is by the use of fresh human blood. The simplest and most satisfactory method is to withdraw from the arm of one of the parents, or other suitable individual, 30 to 50 c.c. and inject it subcutaneously or intramuscularly into the patient. This may readily be accomplished by using a relatively large syringe which holds, say, 20 c.c. By having two needles, leaving one in the vein when the syringe is filled, and using the other to inject the infant, it becomes feasible to easily and rapid-

ly administer the treatment. The child should be reinjected every four to eight hours, depending upon the behavior of bleeding. This injection should be continued for one to two days or longer if the tendency to hemorrhage persists. Another simple procedure is to use an anticoagulant, the best of which is sodium citrate, in about 0.2 per cent. solution. This method has the advantage of permitting more time in the procedure, as there is no danger of the blood clotting. Another point in its favor is that a large amount, say 200 c.c., may be drawn from the donor into a citrate solution, and if kept cool will remain active for a week, and can be injected subcutaneously or intramuscularly in doses of 30 to 50 c.c. every four to eight hours. The use of the fresh or citrated blood, on account of the ease and rapidity of its application, will as a rule take preference over the direct transfusion. Where the infant is exsanguinated, direct transfusion may be desirable. The use of fresh animal serum or the dried precipitated sera is much less desirable than fresh human blood on account of the danger of anaphylactic reaction and inactivity of the preparation used. The use of supposed coagulants, as calcium chloride or gelatin, which at most are of questionable value since the use of fresh blood, can be dispensed with. Especially should the physician avoid wasting valuable time by trying these remedies first, rather than resorting at once to the use of fresh blood.—(Musser and Kelly's *Practical Treatment.*)

2. *Drugs used to cause an increase in the flow of urine:* Potassium acetate, bitartrate, and citrate; sodium acetate; ammonium acetate; lithium citrate and carbonate; magnesium citrate and sulphate; water; milk; digitalis; strophanthus; convallaria; squill; sparteine; calomel; caffeine; the nitrites; alcohol; cantharides; juniper; buchu; uva ursi.

"There is much difference of opinion as to *the use of diuretics in acute nephritis.* Some observers believe that all diuretics are irritating to the kidneys and therefore should be withheld at least during the stage of engorgement. Most authorities admit, however, that mild alkaline diuretics, like the vegetable salts of potassium, often serve a useful purpose in removing from the uriniferous tubules proliferated epithelium, albuminous plugs, and effete matter. From 20 to 30 grains of the citrate or acetate of potassium may be given three or four times a day, well diluted. Later in the disease, when the pulse tension falls, experience has proved that digitalis is often of great value. From 2 to

4 fluid drams should be given every three or four hours. It may be combined advantageously with an alkaline diuretic."—(Stevens' *Materia Medica and Therapeutics.*)

3. *Treatment of summer diarrhea in infants:* "Hygiene should be improved and exposure prevented. Feeding should be corrected. Cleanliness is imperative. Woolen clothing should be worn next to the skin when there is susceptibility to changes in the atmosphere. During the attack all food should be withheld for from twelve to thirty-six hours, and the child placed in bed. The thirst may be quenched by water, ice, barley-water, etc. If the child is weak brandy, gtt. 10-15, may be given. For the abdominal pain warm baths, turpentine stupes, spice poultice, and mustard plaster may be necessary. When food is given again it must be weak and in small quantities. The alimentary canal should be cleared of all irritating material by syrup of ipecacuanha, 31, if the stomach contains food, or by castor oil, equal parts of castor oil and aromatic syrup of rhubarb, 31 every hour until free bowel movement, or calomel, gr. ½, with soda bicarbonate, gr. 1, for four or five doses. The colon should be irrigated once or twice daily. If improvement is not marked in from twenty-four to thirty-six hours intestinal antiseptics, astringents, or both may be administered."—(*Pocket Cyclopedia.*)

4. In the treatment of syphilis, mercury may be administered: (1) *By the mouth:* Hydrargyri iodidum flavum, gr. 1/6 to 1; hydrargyum cum creta, gr. 1 to 2; hydrargyri chloridium corrosivum, gr. 1/12; each of these doses should be given three times a day. (2) *By inunction:* Unguentum hydrargyri, 2 to 4 drams every night on a different part of the skin. (3) *By intramuscular injection:* Calomel, gr. 1 or 2 in sterilized olive oil; or oleum cinereum, 1 dram; or mercuric salicylate, 1 c.c. of 10 per cent. suspension in oil. (4) Other methods include intravenous injections, spinal injections of mercurialized serum, inhalations of mercury or calomel vapor, fumigation, and plasters.

5. *Symptoms and signs of mercurialism:* Sore teeth, spongy gums, profuse salivation, fetid breath, bluish line on the gums along the margins of the teeth, swelling of the salivary glands, aching of the jaws, fever, emaciation, anemia, diarrhea, cachexia, and malnutrition.

6. *Choral hydrate* is a compound of trichloraldehyde and a molecule of water. It is soluble in water, is neutral in reaction, has an ethereal odor, a sharp taste,

and is easily decomposed under the influence of sunlight and potassium chlorate. On the *central nervous system* it acts as a hypnotic; it depresses and paralyzes the nervous system. It depresses the *heart*, and causes dilatation of both auries and ventricles. The usual adult dose is about 8 or 10 grains.

7. ℞.

Acidi nitrohydrochlorici diluti ♏vj.
Tincturæ aurantii amari.
Tincturæ calumbæ āā ʒj.
Infusi gentianæ q. s. ad ʒx. M.

Sig. One tablespoonful in a wineglassful of water, after each meal.

8. *Prolonged therapeutic doses of digitalis may cause:* Weak, dicrotic pulse, perspiration, nausea, vomiting, lowered reflexes, lowered body temperature, vertigo, muscular tremors, lassitude, delirium, stupor.

9. Digitalis, strophanthus, and convallaria.

10. For an *acute attack of asthma*, the following have been used: The fumes of ignited stramonium or belladonna leaves which have been steeped in potassium nitrate; these drugs may be burned in the patient's room, or smoked as cigarettes. Amyl nitrite, 5 to 6 minims, by inhalation; or a few whiffs of chloroform. Adrenalin solution (1:5000) on a pledget of cotton applied to the nasal mucous membrane or sprayed on to it. A hypodermic of morphine sulphate, ⅛ of a grain. Heroin hydrochloride, hypodermically, in 1/12 grain doses. Inhalation of compressed air or oxygen.

Hygiene and Medical Chemistry

1. The men may be suffering from various inherited defects; or from diseases due to accident or injury, or to the effects of climate, or to bad habits and modes of life (such as venereal diseases, and alcoholism); or to diseases such as typhoid, cholera, malaria, dysentery, etc. Improper food, clothing, hardships, and overcrowding are also factors. Any diseased condition of heart, blood vessels, nerves, lungs, abdominal organs, joints, feet, etc., may also cause inefficiency.

2 and 3. The following extracts are from the regulations prepared by the Surgeon-General of the Army:

The physical examination should take place in a large, well-lighted room. The person examined is to be stripped. The examining physician should proceed in substantially the following order, viz:

(*a*) Observe the general condition of the skin, scalp, and cranium, ears, eyes, nose, mouth, face, neck, and chest. Take weight, height, and chest measurements.

Accepted measurements are as follows, all chest measurements to be taken on a level just above the nipple:

Height		Weight	Chest Measurement	
			at Expiration	Mobility
Feet	Inches	(Pounds)	(Inches)	(Inches)
5 4/12	64	128	32	2
5 5/12	65	130	32	2
5 6/12	66	132	32½	2
5 7/12	67	134	33	2
5 8/12	68	141	33¼	2½
5 9/12	69	148	33½	2½
5 10/12	70	155	34	2½
5 11/12	71	162	34¼	2½
6	72	169	34¾	3
6 1/12	73	176	35¼	3
6 2/12	74	183	36¼	3
6 3/12	75	190	36¾	3¼
6 4/12	76	197	37¼	3½
6 5/12	77	204	37½	3¾
6 6/12	78	211	38¼	4

To be acceptable, men below 64 inches in height must be of good physique, well developed, and muscular.

Variations in weight above the standard are not disqualifying, unless sufficient to constitute obesity. Unless exceptionally well proportioned, men above 6 feet 6 inches in height should be rejected.

(*b*) The arms being extended above the head, backs of hands together, the applicant is required to cough vigorously; any form of rupture may now be discovered by the hand and eye, but still better by the index finger passed up to the external ring.

(*c*) The arms remaining extended above the head, the applicant is required to take a long step forward with the right foot and bend the right knee; the genital organs are now conveniently exposed and varicocele and other defects in the scrotum may be recognized.

(*d*) Arms down and the man required to separate the buttocks with his hands, at the same time bending forward; this exposes the anus.

(*e*) Examine heart and lungs; rate of pulse and respiration.

(*f*) Upper extremities: Make sure that all joints are free and supple, from the phalanges to the shoulder.

(*g*) Lower extremities. The person under examination is required to leap directly up, striking the buttocks with the heels, to hop the length of the room on the ball of first one foot and then the other, to make a standing jump as far as possible and repeat it several times, to run the length of the room in double-time several times, after which his heart and lungs are reexamined.

(*h*) *Mental.*—The mental examination should be

such as to develop whether or not the man examined is possessed of normal, sound understanding.

(*i*) *Vision.*—Examine each eye separately, without glasses, covering the other eye with a card (not with the hand). The applicant is directed to read the test types from the top of the chart down as far as he can see, and his acuity of vision recorded for each eye, with the distance of 20 feet as the numerator of a fraction, and the size of the type of the lowest line he can read correctly as the denominator. The minimum visual requirements are as follows: 20/40 for the better eye, and 20/100 for the poorer eye, provided that no organic disease exists in either eye.

(*j*) *Hearing.*—To determine the acuity of hearing, place the applicant facing away from an assistant who is 20 feet distant and direct him to repeat promptly the words spoken by the assistant. If he cannot hear the words at 20 feet, the assistant should approach foot by foot, using the same voice, until the words are repeated correctly. Examine each ear separately, closing the other ear by pressing the tragus firmly against the meatus. The examiner, whose hearing should be normal, faces in the same direction as the candidate and closes one of his own ears in the same way as a control. The assistant should use a low conversational voice (not a whisper), just plainly audible to the examiner, and should use numerals, names of places, or other words or sentences until the condition of the applicant's hearing is evident. The acuity of hearing is expressed in a fraction the numerator of which is the distance in feet at which the words are heard by the candidate and the denominator the distance in feet at which the words are heard by the normal ear; thus 20/20 records normal hearing, 10/20 imperfect hearing, etc. The hearing with both ears open should not be below 10/20.

4. Woolen fabrics are warm for cold and windy weather. Wool is a poor conductor of heat and is not easily penetrated by cold winds. Paper is also a good protective against cold winds, and a paper vest will conserve the warmth of the body.

5. *In selecting a camp site* the following conditions should be borne in mind: The presence of water, wood, and grass. The soil should be dry and elevated, with some protection from winds. There should be space enough to accommodate the men without crowding. Old camp sites should be avoided because the soil is certain to be polluted and may be infected. Excess of vegetation and dense woods should be avoided on ac-

count of the extreme moisture or dampness which they induce. Marshes and stagnant water should also be avoided on account of mosquitoes.

6 and 7. "Upon arriving at the selected site, the first duty which concerns the medical officer, if the matter has not been previously attended to, is an examination of the water supply and the determination of the place or places where drinking and cooking water should be drawn. Below this, if the supply is from a stream, other places should be likewise set apart for watering animals, for bathing, and for washing clothing, in the order named." . . . The camp is to be arranged in columns of companies, at convenient distances. Generally the arrangement for each company will be in two lines, facing each other, with a distance of 15 to 20 yards between the lines; this space forming the company street. From the sanitary point of view the great guiding principle is to separate the kitchen and messes as far as possible from the latrines. Therefore, the rule is to place the kitchen on one flank of the company and the latrine on the other. Near the kitchen is the store tent, and a pit for liquid wastes when cans are not provided for the purpose. Next to the line of kitchens is the line of officers' tents. Plans are prescribed in the Field Service Regulations. (From Havard's Military Hygiene.) The huts may be made to accommodate four to eight men, or barracks may be built to accommodate about one hundred men. According to Smith (quoted in Munson's Military Hygiene), "a space should be cleared for about three feet around the proposed site. The ground to be included should be smoothed and slightly raised, never excavated, and should be pounded or hardened. Trenches should be dug around the huts, and thence in a direction and to the distance required for effective drainage. The ground outside may be slightly raised, but an embankment should never be erected around the bottom for the sake of warmth, but instead the hut may be lined to a convenient height within, to ward off currents of cold air. The cleared space outside should be paved or covered with gravel. Wooden floors should be laid, if possible, and suitable provision made for the entrance of the air from the outside through either the floors or the lower part of the walls. Eaves should carry the rain some distance from the walls and, if possible, porches should be built, as adding much to the comfort of the inhabitants. Ventilation should be secured at ridge, end, and sides." The roofs and outsides may require waterproof sheath-

ing paper; the windows may be fitted with sliding sashes or work on hinges. As a rule, each man should have from 600 to 1000 cubic feet of space, and if the huts or barracks are 10 feet high, this means from 60 to 100 square feet of floor space.

8 and 9. *Typhoid.* Water should be boiled; food must be screened from flies and protected from dust. Those attending the patient must wash their hands with soap and water and with an antiseptic lotion. Protective inoculation is of value to those liable to exposure. The urine and feces must be disinfected; soiled linen or clothing must be kept protected from flies and then boiled before being sent to the laundry. Flies must be kept out of the house. "Carriers" must be avoided.

Typhus. Personal cleanliness is essential; all unnecessary contact with the sick must be avoided, and rubber gloves should be used when attending patients. Cleansing and whitewashing of dark and dirty places should be enforced; sulphur dioxide is a good disinfectant. Quarantine suspected cases. In inhabited houses, phenol is a good disinfectant. Lice and bedbugs, if on the body, should be attacked by mercurial ointment; if in clothing, the latter should be disinfected by steam.

Yellow fever. Destroy the mosquitoes (and their larvæ), or keep them out of the houses. The patient must be isolated in a mosquito-proof room.

Malaria. Destroy the anopheles mosquito. Screen the houses. Persons who have malaria should take quinine regularly.

Syphilis. Notification of the disease, and instruction of the patient. Proper provision should be made for the treatment of genitourinary and venereal diseases. The use of a prophylactic calomel ointment should be advised to those who intend to take risks.

10. A little water should be placed in a large, clean bottle, and then shaken vigorously; if the water is much contaminated an offensive odor will be observed. Germ-laden water should be boiled. The use of chlorinated lime is recommended. Three grains of this substance will purify a barrel of water.

PRACTICE AND PATHOLOGY.

1. *Three serious complications of scarlet fever:* (1) *Nephritis.* Prognosis is favorable under proper treatment, but the convalescence may be prolonged and the kidneys may remain susceptible to serious lesions for a long time; in grave cases uremia may occur, and lead

to convulsions, coma, and death. Treatment consists of rest in bed, milk diet, hydragogue cathartics (not mercury), hot packs. (2) *Arthritis.* Prognosis is favorable, with care. Treatment consists of warm and sedative applications. The affected joints should be wrapped in cotton wool, and alkalies should be administered (salicylates tend to irritate the kidneys). (3) *Endocarditis.* Simple endocarditis has a good prognosis; the septic or toxic variety is more serious, and may prove fatal. Treatment includes the use of digitalis, strychnine, and (perhaps) alcohol.

2. In *typhoid fever* the pulse is slow and dicrotic; the fever is characteristic and generally responds to hydrotherapy; the spleen is generally (and considerably) enlarged; the rose rash is present and is characteristic; the lungs do not show any lesions; diarrhea is quite common; intestinal hemorrhage and perspiration are common complications. In *acute miliary tuberculosis,* the pulse is more rapid and is not dicrotic; the fever has no regular cycle, but is irregular or remittent; the spleen is less frequently enlarged and such enlargement appears later and is less pronounced; there is no characteristic rose rash, but drenching sweats are common; the lungs are apt to be affected, and on examination râles, tympanitic percussion rote, and pleural adhesions may be found; cyanosis and dyspnea are often present; diarrhea is not common; intestinal hemorrhage and perspiration do not occur.

3. *Lobar pneumonia. The first stage* is characterized by sudden onset with chill, a sharp pain in the side, rise of temperature, a short and sharp cough, rusty-colored, viscid sputum, and dyspnea. There may be headache, insomnia, scanty urine with diminution of urea, chlorides, phosphates, and sulphates, insomnia, and herpetic vesicles on the face, and there is always an increase in the number of leucocytes in the blood. Physical examination will reveal diminished expansion, impairment of the normal percussion note, feeble or suppressed respiratory murmur, moist or dry râles, crepitation, and sometimes a pleural friction sound.

In the second stage the dyspnea is more marked; the face is more or less livid in color; the temperature is high (104°-105° F.); and the pulse increases in rate (110-120), its tension and fullness lessening with the progress of the disease, and growing feeble and intermittent. Headache, delirium, and various other nervous symptoms may be present. Expansion is diminished and vocal fremitus is exaggerated upon the affected side. There is dullness with increased resistance

over the consolidated lung, and auscultation detects bronchophony or bronchial breathing over this same area.

The third stage is ushered in by a sudden drop of temperature on or about the fifth or ninth day, followed by a natural sleep, free sweating, and relief from suffering. In this stage the subcrepitant râle (râle redux) is heard in the midst of the bronchial breathing, together with numerous moist râles. Dullness may persist for some time, but usually by the twelfth or fourteenth day the lung has returned to its normal state.—(*Pocket Cyclopedia.*)

4. "As a rule, the first symptoms presented in cases of chronic lead poisoning are debility, general malaise, attacks of indigestion, loss of appetite, constipation, thirst, and a metallic taste in the mouth. When the bowels do move, the stools are usually dark colored from the presence of lead sulphide. The urine is usually scanty and high colored. The breath is fetid. There are frequently attacks of colic in which the pain may be severe and is usually located about the umbilicus. Loss of strength, loss of flesh, cold, moist skin and a rather dull, listless expression are usually associated with it. Perhaps the most definite appearance on physical examination, and the one upon which a diagnosis may be based with a great degree of certainty, is the presence of the so-called 'blue line,' which appears along the line where the gums come into contact with the teeth. Its presence is most marked over the incisors, and is due to the deposition of lead sulphide in the capillaries of the gums. Silver and mercury may also produce a somewhat similar appearance, and it may be absent in lead poisoning, but when present to any considerable degree it is in itself almost diagnostic. In certain cases of lead poisoning the symptoms of digestive disturbances may be almost entirely wanting, while those which depend upon the effect of lead upon the nervous system may be very prominent. The most important of these are so-called 'lead-palsy' or 'lead paralysis,' which is most commonly located in the muscles of the arms, resulting in the well known 'wrist-drop.' Epileptiform convulsions occur not infrequently among the later symptoms of chronic lead poisoning."—(Dwight's *Epitome of Toxicology.*)

5. In the second stage (effusion) of acute pleurisy: *Inspection* shows bulging or fullness of the affected side, with obliteration of the intercostal spaces and displacement of the cardiac impulse.

Palpation demonstrates feeble, or absence of, vocal fremitus over the effusion, with exaggeration of the same above the fluid. The affected side is immobile, and very rarely fluctuation may be obtained. *Percussion.* Dullness or even flatness, with increased resistance may be obtained directly over the fluid, while above the effusion the percussion-note is tympanitic. The line of demarcation is higher behind than in front. Effusion of the left pleural cavity obliterates Traube's semilunar space. The fluid changes its level with different positions of the body and the area of dullness is correspondingly movable. *Auscultation.* During the stage of effusion, the vesicular murmur is feeble or absent on the affected side depending upon partial or complete compression of the lung by fluid. Above the effusion, puerile breathing is heard, and just at the upper margin of the fluid a friction sound may be heard. Vocal resonance is diminished or absent over the fluid and markedly increased above the effusion, egophony being obtained at its upper margin. With the absorption of the fluid, the vesicular murmur and the moist friction sound gradually return.—(From Hughes' *Practice of Medicine.*)

6. The persons who do not develop hay fever after being exposed to irritant pollen are probably lacking in the predisposing factors, namely an inherited tendency to the disease, chronic nasal disorder, and a nervous temperament. The people who suffer from the disease have a particular hypersusceptibility to the toxin.

7. *Chronic gastritis.* "The lesions vary considerably in different cases. In cases, mild and of short standing, the mucous membrane is thickened, pale gray color, somewhat congested, though less so than in acute gastritis, and covered by a tenacious mucus. Many dilated and enlarged veins may be visible, especially in the gastritis of portal obstruction, and there are frequently small areas of hemorrhage and pigmentation—occasionally of superficial erosion. The glands are usually choked with retained secretion and may enlarge to form small cysts. In more aggravated cases, the entire wall of the stomach participates in the process, and the mucous membrane may be thrown up into small polyp-like projections. Histologically, the lesions are those of interstitial inflammation with parenchymatous degenerations. In most cases, after the lapse of time, atrophic alterations, and more or less dilatation of the stomach, result. The mucous membrane, as well as the entire wall of the stomach, becomes much

thinned, the gastric tubules atrophy and may eventually disappear and be replaced by sclerotic fibrous tissue, giving to the mucous membrane an exceedingly smooth appearance, which may be interrupted here and there by a small cyst. In rare cases the stomach becomes much diminished in size (so that its capacity may only be a few ounces), and its wall very much thickened in consequence of hyperplasia of the submucosa and muscularis."—(Kelly's *Practice of Medicine.*)

8 and 9. In both of these cases the treatment is that of pneumonia, but in the former case care must be taken lest the patient be unduly exposed to anything which may irritate the kidneys, and the diet must contain as little nitrogenous matter as possible.

The *treatment of pneumonia* "depends entirely on the type of case, and the condition of the patient. Routine treatment is the worst of all treatments. Answer the following questions before prescribing: Is the patient full-blooded, and is there a full bounding pulse? Is the pulse feeble, irregular, or intermittent? In the first case, in a young and previously healthy adult, if there be cyanosis, or signs of dilatation of the right heart, blood-letting to the extent of a few ounces may perhaps relieve the strain, but more generally treatment should be directed to maintaining the strength from the outset. In the latter case we can hope for nothing from a depressing treatment, so stimulants must be resorted to, such as alcohol, ammonium carbonate, egg and brandy mixture, quinine, ether, etc. The giving or withholding of alcohol depends upon its effect upon the pulse; should the pulse rate fall and the tongue become moist it may be continued. In asthenic cases, strychnine hypodermically is necessary from the outset, and normal saline may be given by the rectum or by the skin. Oxygen inhalations are used where there is cyanosis, but it is doubtful whether they have saved many lives. When there is evidence of failure of the heart (weakness of the second pulmonary sound, etc.) digitalis should be resorted to. Many prescribe it from the outset. The diet should consist of milk, beef tea or broths, white of egg, and so on. The patient should be as little moved as possible, and the bed-pan must be used. As in other fevers, an airy room and good nursing are essential. Remember that narcotics are not well borne in respiratory embarrassment as a rule. Chloral should be avoided, but *if pain be excessive* a hypodermic injection of morphine does *more good* than harm, notwithstanding that theoretically morphine is contraindicated. It should not

be given later than the first few days of the illness. The pain may also be relieved by poultices, which, however, are of doubtful use if carelessly made, or by application of ice. Cold packs applied to the trunk only, and frequently repeated, are very useful in relieving both pain and fever. Depressant antipyretics are to be avoided. The results of *serum treatment* are not unequivocally encouraging, but vaccine treatment would seem to be of better promise. Where possible an autogenous vaccine should be used."—(Wheeler and Jack's *Handbook of Medicine.*)

In the case with the arrested tuberculosis, care must be taken during convalescence lest the patient again show signs and symptoms of an active tuberculous process.

10. "It is a well recognized fact that *lobar pneumonia of infancy* and childhood is a self-limited disease, and that unless special indications arise no active medicinal treatment is required. This does not mean that most careful medical supervision is not desirable, or that the most intelligent nursing could well be dispensed with, or that drugs should not be administered if indicated. Without any special line of treatment the mortality of lobar pneumonia in children is less than 5 per cent. The drugs most frequently required are the stimulants. In those cases where the heart action becomes weak and rapid, the use of the ammonium preparations, such as the aromatic spirits, in 5- to 10-drop doses, may be repeated every hour or two, or the carbonate of ammonia in 1-grain doses, the taste of which should be disguised by a syrup. In extreme cases the tincture of digitalis in 1- to 3-drop doses, for a child under six years of age, or the hypodermatic injection of camphorated oil (10 per cent.) in doses of 5 to 10 drops, may be repeated at intervals of one to two hours. If cyanosis occurs, with dilatation of the right heart, strychnine used hypodermatically in doses of 1/100 to 1/150 of a grain, and repeated cautiously, seems sometimes to tide a patient over a critical period. Those cases which seem to go into a collapse during the precritical period are benefited by hypodermatic injection of strychnine or the inhalation of oxygen."—(Musser and Kelly's *Practical Treatment.*)

OBSTETRICS AND GYNECOLOGY.

1. "The important signs and symptoms of toxemia are those indicated by disturbances in digestion and assimilation, an altered state of the blood, and as a result nausea and vomiting, persisting throughout the

patient's waking hours. Accompanying this is great prostration, loss of appetite, a heavy lethargic sleep, later giving place to unpleasant dreams and restlessness, the failure to retain anything upon the stomach, obstinate constipation, and substernal pain extending from the epigastrium. The pulse is rapid and grows progressively weak, respiration is sluggish, and as the disease *progresses* the matter ejected from the bowel contains an abundance of disintegrated blood cells which resemble coffee-grounds. The urine is diminished greatly in quantity, with high specific gravity, frequently albuminous, and often contains epithelial or granular casts. The nitrogen partition shows greatly lessened urea with corresponding increase in creatin and creatinin, the rest nitrogen is increased, and indican is present. Casts of various sorts are often found. As the *disease* progresses the patient in some cases becomes greatly emaciated, in others there is considerable deposit of fat, the action of the heart is progressively rapid and weak, frequently becoming thready and irregular. The mouth and gums become covered with sordes, the odor about the patient is offensive and the skin is in places the site of a purpuric or hemorrhage condition."—(Davis's *Manual of Obstetrics.*) Later on eclampsia may ensue.

The symptoms of this condition are: Headache, nausea, and vomiting, epigastric pain, vertigo, ringing in the ears, flashes of light or darkness, double vision, blindness, deafness, mental disturbance, defective memory, somnolence; symptoms easily explained by the circulation of toxic blood through the nerve centers. These may be preceded by lassitude, and accompanied by constipation, or by diarrhea. Headache is perhaps the most significant and common warning symptom. In bad cases the urine is reduced in quantity (almost suppressed,) very dark in color, its albumin greatly increased, so that it becomes solid on boiling. Next comes the final catastrophe of convulsions. The convulsive fit begins with twitching of the facial muscles, rolling and fixation of the eyeballs, puckering of the lips, fixation of the jaws, protrusion of the tongue, etc., soon followed by violent spasms of the muscles of the trunk and limbs, including those of respiration; hence lividity of the face and stertorous breathing, biting of the tongue, opisthotonos, etc. The fit lasts fifteen or twenty seconds, ending in partial or complete coma, possibly death; or consciousness may return, to be followed by other convulsions. For *preventive treatment:* (1) The amount of nitrogenous food should

be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation of the uterus should, if necessary, be removed by evacuating that organ. The *curative treatment includes:* (1) Controlling the convulsions (by chloroform, veratrum, or chloral); (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

2. *Mechanism of L. O. P. position.* 1. Flexion. 2. Descent. 3. Rotation, in the majority of cases all the way round to the symphysis pubis (when, on reaching left acetabulum, it, of course, becomes converted into a L. O. A. position); in the minority of cases backward rotation of occiput to sacrum. 4. Extension of occiput downward and backward over perineum, while forehead, nose, and chin, successively escape under public arch. 5. Restitution, internally of shoulders, right one to pubes, left to coccyx; externally of occiput to left thigh (thigh corresponding to the sacroiliac synchondrosis at which it originally presented).—(King's *Obstetrics.*)

3. The *absolute indications for cesarean section* are: Extreme pelvic contraction or deformity in which delivery by forceps or version or symphyseotomy is impossible, and in which craniotomy is either impossible or would be more dangerous to the mother; the presence of extreme atresia of the vagina; rupture of the uterus; sudden maternal death. A pelvis of seven centimeters or less in its conjugate diameter is an indication for cesarean section.

4. *Treatment of prolapsed funis* consists in: (1) Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor; (4) speedy delivery, by forceps or podalic version. If the child shows signs of asphyxiation, the various methods of artificial respiration should be tried and persisted in.

5. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta

prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of fetus toward the end of pregnancy; (6) hydatidiform mole; (7) habitually large fetal head. The methods that may be employed are: Partial dilatation of the cervix and the introduction within the cervix (and vagina) of a tamponade of sterile gauze; (2) dilatation of the cervix; (3) puncturing the membranes; (4) introduction of soft rubber bougie into the uterus; (5) intrauterine injection of glycerine, water, or some other fluid.

6. *Ventrofixation* consists in fixing the uterus to the anterior abdominal wall; it is performed for displacement of the uterus, and is often more satisfactory than shortening the round ligaments. Hermann (*Students Handbook of Gynecology*) states objections to this operation as follows: "(1) Its risk. Oversights will occur in the practice even of the most careful; but the risk is very small. (2) Adhesions within the peritoneum are sometimes absorbed. They are absorbed often enough to make stitching of peritoneum to peritoneum unsatisfactory. After abdominal section ventral hernia may first develop after the scar has held firm for twelve years, and possibly the new attachment of the uterus may also, after many years, give way. (3) The operation lifts up the uterus. If the vulval orifice is very large there may still be a protrusion of the vaginal mucous membrane. It is well, therefore, to precede ventral fixation in women past child hearing by posterior colporrhaphy. (4) It is said to cause difficulty in labor, should the patient become pregnant. It does not always do so, and in many cases reported as illustrating such difficulty, the ventral fixation was not the cause of the difficulty. Ventral fixation after colporrhaphy, if the result be permanent, relieves the patient of any necessity for the continual readjustment of a pessary, and lifts the uterus up effectually. Ventral fixation is not advised in cases in which the womb can be comfortably kept up by a pessary."

7. *Cystocele* is a hernia of part of the bladder into the vagina, covered by the mucous membrane of the anterior vaginal wall. *Causes:* Lacerated perineum, prolapsed uterus, relaxation of the structures forming the pelvic floor, and subinvolution of the vagina after labor.

For radical cure of cystocele: "The patient is placed in dorsal position. The posterior vaginal wall is kept out of the way with a weighted speculum. The cervix is drawn down with a bullet-forceps. With a pair of tenacula the sides of the prominence are drawn to-

gether in the median line in order to see how much of the wall is redundant and these points are marked with small nicks. Next, the whole surface is put on the stretch between four pairs of forceps—one at each of the sidemarks, one near the cervix, and one at the transverse ridge at the inner end of the urethra. With a pair of scissors curved on the flat, a strip about ¼ inch wide is cut out of the mucous membrane. Similar strips are removed on both sides until an oval is denuded. Finally a running suture of chromicized catgut is passed under the whole pared surface, uniting the edges from side to side." If necessary, a perineorraphy should be done at the same time.

8. *Cancer of the body of the uterus is diagnosed* by the history, symptoms, and physical signs. It is a disease of advancing years, and generally occurs after the menopause; nulliparæ and multiparæ are equally liable. The chief symptoms are hemorrhage and discharge with an offensive odor, pain, and cachexia. The cervix is soft, the uterus enlarged and tender.

Pathology: Cancer of the body occurs *in less than 2 per cent. of all cases.* It is more frequent in *nulliparæ* than *carcinoma cervicis*, and tends to occur rather *later in life* than cancer of the cervix. The disease begins *superficially* or *deeply in the mucosa. Epithelioma, malignant, adenoma, adeno-carcinoma*, and *pure carcinoma* are found, the latter being of the *scirrhous* or *medullary type.* In the malignant adenoma there is an *atypical proliferation of the glands;* they become folded up *irregularly;* the intervening connective tissue may be *very scant*, and the gland spaces may *touch at points.* They are lined with a *single layer of columnar epithelium.* In the adeno-carcinoma, parts may show the structure of the *malignant adenoma*, and parts that of the *ordinary* cancer where the *loculi are filled with epithelial cells.* These growths form *swellings in the wall.* When near the cavity, the *mucosa may ulcerate over them.* Gradually the *uterus becomes excavated.* Adhesions *may* form with *adjacent structures*, and secondary deposits develop in the peritoneum, ovaries, tubes, vagina, etc. The epithelioma may grow *diffusely* through the *whole cavity*, or as an *isolated fungoid growth*, which may become polypoidal. Metastatic nodules may form in *different parts of the uterine wall.* These tumors are covered with *layers* of *polyhedral cells;* very rarely *pavement epithelium* is found like that in ordinary epithelioma. The mucosa of the body gets thinned."—(Webster.)

9. *Dysmenorrhea is classified* as: Congestive,

ovarian, membranous, obstructive, and neuralgic. *Causes:* Pelvic congestion, pelvic inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis or obstruction of the cervix, prolapse or displacement of the uterus.

10. An *erosion* of the cervix is an area on the vaginal surface of the cervix which is covered with columnar epithelium, and consequently presents a reddened, inflamed appearance. Some confusion has resulted from the application of the term *ulceration* to this condition. There is no ulcer and no granulating surface, for the whole area is still covered with epithelium. The erosion is caused by an irritant vaginal or uterine discharge (*e.g. gonorrhea*, endometritis). The causes are unknown; friction, ill-fitting pessaries, carcinoma, tuberculosis, chancre and chancroid have been said to be causative factors. *Treatment:* A possible cause should be sought for and corrected. The general health will be improved by the administration of preparations containing iron, such as Blaud's pill, Basham's mixture, and the four chlorides. Exercise, diet, and the condition of the bowels should receive attention. The local treatment consists in the administration of hot vaginal douches two or three times daily; the use of glycerine tampons for twelve hours, twice a week; the application of tincture of iodine to the cervix, once a week; and the application of silver nitrate, zinc chloride, pure carbolic acid, or Churchill's tincture of iodine directly to the cervical mucous membrane.

SURGERY.

1 and 2. Tetanus is caused by the bacillus of tetanus, which is a rodlike organism, with one end somewhat enlarged owing to the presence of a spore. It is anaerobic, and is found chiefly in punctured wounds; it can also grow on surface wounds when pyogenic cocci absorb all the oxygen. It is found in the soil. The period of incubation is about ten days. Prevention lies in the careful disinfection of all wounds; punctured wounds should be enlarged, disinfected, and drained; antitoxin is recommended by some. Treatment consists in excision of the affected part (if possible), followed by dressing with antiseptic fomentations. Tincture of iodine is a good antiseptic. Antitoxin has been used. The patient should be isolated and kept quiet in a darkened room. Bromides, chloral, morphine, and even chloroform may be required. Venesection followed by intravenous infusion of salt solution is sometimes employed.

3. The causative organisms in gas-producing infections are the *Bacillus aerogenes capsulatus, Streptococcus pyogenes, Staphylococcus pyogenes,* the bacillus of malignant edema, and the *Bacillus coli communis.* Gas infections are chiefly found in injuries which have destroyed the circulation of the part, and in which the general resistance of the tissues has been lowered; crushing injuries, in which the soil and other dirt may have been ground into the tissues, are also liable to this form of infection. The gas bacilli are found in the soil, being anaerobic. Treatment consists in prompt amputation high up above the gangrene and infection. If seen very early, free incisions with constant irrigation or immersion in a warm antiseptic fluid may be of benefit. Tonics, nourishing food, and stimulants are indicated. During the war, gas gangrene has been found to affect the muscles chiefly; treatment consists in resection of the affected muscles.

4. *Symptoms of acute appendicitis:* Sudden pain in right iliac fossa, vomiting, constipation, slight fever, tenderness at or near McBurney's point; there may be localized rigidity and swelling. The patient lies on his back with the right thigh flexed.

Symptoms simulating those of appendicitis may be found in: Gastroenteritis, intestinal obstruction, typhoid fever, gastric ulcer, duodenal ulcer, salpingitis, ovaritis, kinking of ureter, renal colic, hepatic colic, ruptured extrauterine pregnancy, peritonitis.

5. The *advantages of McBurney's operation* are that no nerves are severed and there is little or no chance of an abdominal hernia after the operation. The *disadvantages* are that it is not applicable in cases where there are many adhesions, and the incision cannot be enlarged at will.

The *vertical incision* is suitable for all cases, the incision can be extended and almost any point be reached; but there is a possibility of hernia after the operation, and nerves are severed.

6. *Treatment for a recent fracture of the nose:* External pressure aided by padded forceps in the nostrils; plugging of the nostrils; a moulded gutta-percha splint fixed over the nose by a bandage; sometimes a Mason pin is required.

7. FRACTURE OF BASE OF THE SKULL. The *Signs* are those of (1) injury to the brain, (2) escape of cranial contents, (3) injury of cranial nerves. (1) *Injury to the brain* may be of the nature of concussion, compression, or laceration. (2) *Escape of cranial contents,* which may be blood, cerebrospinal fluid, or rarely

brain itself. 1. *Hemorrhage* manifests itself in various situations, according to the position of the fracture. In the *anterior fossa* the bleeding may be from the nose or into the orbit, or may pass back into the pharynx, be swallowed, and subsequently vomited. The eye may be pushed forward and pulsate if the cavernous sinus be ruptured. In the *middle fossa* blood usually runs from the ears; but slight bleeding from the ear may be caused by minor injuries, such as rupture of the membrana tympani, tearing of the lining of the auditory canal, and fracture of the tympanic bone. In the *posterior fossa* a hematoma may form behind the mastoid process. 2. The escape of *cerebrospinal fluid* is a certain sign that a fracture communicates with the subdural space. It may appear in the same situations as hemorrhage, but is usually found escaping from the ear owing to fracture of the petrous bone. The fluid is limpid, specific gravity 1005, with no albumin, but containing pyrocatechin, which gives the same reaction as sugar with Fehling's solution. The amount which escapes may be small or very large, but as a rule it soon ceases. (3) *Injuries to the cranial nerves* vary according to the site of fracture. That most commonly involved is the facial in the aqueductus Fallopii, and the paralysis may come on immediately from rupture, or after two or three weeks from the pressure of callus. —(From *Aids to Surgery.*)

8. "Although it is true that aspiration will occasionally cure a pneumococcal empyema in a child, it is generally regarded by surgeons as an exploratory or palliative measure. For the latter purpose it may be used in cases of rapid phthisis, or as a preliminary measure to operation in bad cases in which the effusion is very large or exists on both sides. With these exceptions, *thoracotomy* (opening the pleural cavity), with or without resection of a rib, is recommended in all cases. *Thoracotomy without resection* of a rib is indicated when the patient's condition is very serious, as it is easily performed under local anesthesia, by making an incision about two inches in length along the lower border of the sixth or seventh intercostal space in the midaxillary line. A small opening is made in the pleura, in order to allow the pus to escape slowly; the opening is then enlarged, loose pieces of lymph removed, and a short rubber tube introduced. The tube should be sutured to the skin, to prevent its expulsion, and transfixed with a large safety pin, to prevent its dropping into the cavity. *Resection* of a portion of a rib is the usual operation, as it allows more room for

exploration and free drainage. Ether is contraindicated, because of its effect on the lung. The best general anesthetic is nitrous oxide and oxygen, but chloroform or a local anesthetic may be employed. The patient lies on his back and is brought to the edge of the table. A two or three inch incision, with its center in the midaxillary line, is made over the seventh rib, and the periosteum divided, and separated from the entire circumference of the rib with closed curved scissors or a periosteal elevator. The rib is divided at each extremity of the incision with bone forceps and removed, the intercostal vessels having been pushed aside with the periosteum; the operation then proceeds as in thoracotomy without resection of the rib. Irrigation of the cavity should never be employed in acute cases, as it is occasionally followed by death. In chronic cases, however, in which the adhesions are firm, irrigation with sterile salt solution is often advisable, particularly if the discharge is very fetid. The tube may remain in place until the purulent discharge ceases, or, better, it may be removed at the end of a week, and a Bier suction pump used once or twice daily until the lung is fully expanded. If the sinus persists (pleural fistula), there is caries of a rib or non-obliteration of the cavity. In either case a secondary operation will be required. If the lung fails to reach the chest wall after several months, the chest wall should be taken to the lung by *thoracoplasty* (Estlander or Schede operation). One may first try, however, injection of Beck's bismuth paste. The cavity is filled with mixture No. 1 (not more than 100 grams being used) and the opening allowed to close. If the temperature rises above 101° or severe pressure symptoms appear, the accumulated fluid is evacuated and the opening again allowed to close. Repetition of the injection is necessary only when the paste is discharged with the pus. *Estlander's operation* consists of the resection of a sufficient number of ribs, with the periosteum, to obliterate the abscess cavity. The length and number of ribs to be removed depend upon the size of the cavity. In a large cavity it may be necessary to remove three or four inches of all the ribs from the third to the ninth. This is best done through an I or U-shaped incision, although separate incisions may be made in every other intercostal space, and the rib above and below removed through each incision. The cavity is emptied of all debris and packed with gauze. *Schede's operation* is more radical and more severe. A U-shaped incision is made from the origin of the pectoralis major at the level of the axilla,

down to the lower level of the pleural cavity, then up to the level of the second rib between the spine and the scapula. This flap is reflected upward, and all the ribs over the cavity from the second down, and from their tubercles to the costal cartilages, excised together with the periosteum, intercostal structures, and thickened parietal pleura. Bleeding is checked, the cavity curetted with gauze, and the flap sutured so as to lie in contact with the long, drainage being provided by sterile gauze. After any operation for empyema pulmonary gymnastics should be given to expand the lung. The patient should also have been informed that the resulting deformity is necessary to the cure."—(Stewart's *Surgery*.)

9. In fractures below the insertion of the pronator teres the forearm is placed midway between pronation and supination, and the interosseous space preserved by means of pads. In fractures above this point the forearm should be put on an anterior angular splint, in full supination. If there is a persistent tendency to ulnar bowing of the forearm, i.e. convex toward the ulnar side, the elbow may be extended and a long straight splint or a plaster cast applied.

The essential point is to prevent the growing together of the four fragments in one bony mass, with consequent loss of pronation and supination. Hence, the radius and ulna are kept as far apart as possible, namely in a position halfway between pronation and supination.

10. *The essentials in the treatment of a fractured clavicle*, are to correct the deformity as soon as possible, by fixing the shoulder upward, outward, and backward. The patient may be placed on his back, on a hard bed, with a small pillow under his head and a firm and narrow cushion between the shoulders, a bag of shot on the site of the fracture, and the forearm lying on the front of the chest, while the arm is kept close to the side by a sandbag.

STATE BOARD EXAMINATION QUESTIONS.

State Board of Medical Examiners of Georgia.

ANATOMY.

1. Give origin and distribution of the facial nerve.
2. Describe in detail the humerus.
3. Give origin and insertion of the sartorius muscle.
4. Describe the palmar arch.
5. Describe the gall-bladder and give its relations.

6. Describe the popliteal space.
7. Describe the patella.
8. What is the function of the third cranial nerve?
9. Describe the prostate glands.
10. Where are the Peyer's glands situated?

PHYSIOLOGY.

1. Give the physiological composition of the blood and the function of each part.
2. Where are the red blood cells formed? Where the white blood cells?
3. From what do the new tissue cells originate in the process of repair?
4. What causes the (a) first sound of the heart? The (b) second sound? Locate the point of maximum intensity of each.
5. Give the distribution of the secretory fibers of the facial nerve.
6. How does the acidity of gastric digestion control the passage of food from stomach to intestine?
7. Describe the influence of hydrochloric acid on the pancreatic activity.
8. Give in detail the digestion of fat, stating the channel of absorption.
9. What proven function has the pituitary gland?
10. What effect has atmospheric pressure on respiration?

CHEMISTRY.

1. Name the elements constituting the chlorine group, also its symbol, atomic and molecular weights.
2. What are the symbol, atomic weights, and valence of bismuth and its physical properties?
3. Explain the terms anhydrous, deliquescent, and efflorescent.
4. What is the difference between calcium chloride and chloride of lime?
5. With what substance is calomel liable to be contaminated and how may this impurity be detected?
6. Of what four elements are organic compounds principally composed and name them?
7. What is an alkaloid and into what two classes are they divided?
8. What are the characteristics of the acidulous elements?
9. Describe the prominent symptoms of poisoning by digitalis and what treatment should be adopted.
10. What relation does apomorphine bear to morphine and how is it produced?

MEDICAL RECORD.

BACTERIOLOGY.

1. What is the relation of bacteria to disease?
2. What is the effect of temperature upon the growth and destruction of bacteria?
3. On what theory is tetanus antitoxin administered?
4. Describe in detail the bacterial findings in puerperal septicemia.
5. Give technique of the Widal test.
6. Describe the microscopic blood findings in a case of pernicious anemia.
7. Give most accurate method of determining the opsonic power of the blood.
8. Give average number of bacteria in each leucocyte.
9. Describe the best method of examination (microscopic) of sputum for the presence of tubercle bacilli.
10. What disease conditions are excited by gonococci?

PATHOLOGY.

1. Name and describe briefly the forms of infiltration.
2. Discuss the practical diagnostic value of the leucocyte count, both total and differential in acute appendicitis.
3. Name the different forms of sarcoma, and give the microscopic appearance of the round cell type.
4. Discuss anaphylaxis.
5. Give the pathology of pellagra.
6. Give morbid anatomy both macroscopically and microscopically of chronic interstitial nephritis.
7. Give morbid anatomy of atrophic cirrhosis of the liver.
8. Give the lesions that occur in the intestines in dysentery.
9. Give the etiology and morbid anatomy of acute simple endocarditis.
10. What conditions favor cerebral hemorrhage?

OBSTETRICS.

1. What are the characteristics of the female pelvis and how does the male pelvis differ therefrom?
2. Describe pelvimetry and name the five most important measurements.
3. What precaution as to the urine should be employed in the case of a pregnant woman.
4. Describe methods to determine position of the fetus previous to labor.
5. Define second stage of labor and state the conditions which may cause delay of delivery in this stage, and how such conditions should be managed.

6. How would you determine that a dead infant had been born alive?
7. Give the technique of obstetric asepsis and antisepsis before, during and after labor.
8. Give your method of caring for the new born from birth until it is dressed. (*b*) What attention should the babe's eyes receive?
9. Give causes, symptoms,, and treatment of phlegmasia alba dolens.
10. Discuss gonorrhea in women—symptoms and far-reaching results.

DISEASES OF WOMEN.

1. Describe the uterus.
2. Define menorrhagia; (*a*) Give causes; (*b*) treatment.
3. What is the usual cause of menorrhagia in virgins?
4. Define chronic simple endometritis. (*a*) Give some of its synonyms; (*b*) causes and treatment.
5. Give symptoms and treatment of urethral caruncle.
6. What is the main support of uterus?
7. What is the main object in repairing the perineum?
8. Describe an operation for the repair of perineum.
9. Define pyosalpinx and give your method of handling same.
10. Diagnose cancer of uterus.

SURGERY.

1. What is surgical shock, and how treated? What is differential diagnosis between coma from injury, cerebral apoplexy, uremia, opium poisoning, and alcoholic intoxication?
2. What is a fracture? What is dislocation? Differentiate between fracture and dislocation. What are the cardinal principles in treatment of fracture? Describe Kocher's method of reducing dislocation of shoulder joint.
3. What is understood by amputation of contiguity and continuity of limb? What conditions demand amputation?
4. Give approved classification of burns. Give briefly local and constitutional treatment of burns. Is opium contraindicated? If so, why?
5. Differentiate between scrotal hernia and hydrocele. What is hernia? Give briefly approved operation for radical cure of oblique inguinal hernia.

6. Name briefly most common varieties of fistula. Describe briefly operation for fistula in ano.
7. What is understood by congestion? Inflammation? Give differential diagnosis between abscess and aneurism, and treatment of each.
8. Describe an operation for empyema.

HYGIENE.

1. What is meant by temperament, idiosyncrasy, and diathesis?
2. What is a virus?
3. What are the parasitic diseases that may be caused by eating insufficiently cooked meats?
4. Describe proper ventilation of a room of a pneumonic patient.
5. How long does a diphtheritic patient remain infective after local symptoms cease?
6. How would you instruct a nurse attending a case of diphtheria?
7. What is a disinfectant?
8. How would you disinfect rooms after occupancy by a typhoid and a tubercular patient?
9. Name the diseases, the prevention of which would lengthen the average of human life.
10. What is bubonic plague and how would you handle a case to prevent spreading?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF GEORGIA.

ANATOMY.

1. The *seventh or facial nerve* has its superficial origin in the upper end of the medulla oblongata, in the groove between the olivary and restiform bodies. It passes "forward and outward to enter the internal auditory meatus; it lies upon a groove on the auditory nerve, with portio intermedia of Wrisberg between, and at the bottom of the meatus it enters the aqueductus Fallopii, along which it runs first outward between cochlea and vestibule as far as hiatus Fallopii; then backward in internal wall of tympanum, just above fenestra ovalis, at the turn presenting a swelling, the geniculate ganglion; and finally it passes downward, to emerge from the bone at the stylomastoid foramen; it then passes outward and forward in the parotid, dividing behind the ramus of the jaw into temporo-facial and

cervico-facial branches, which further subdivide and intercommunicate, forming the pes anserinus."—(*Aids to Anatomy.*)

It *supplies* the muscles of expression in the face, the muscles of the external ear, the Platysma, Buccinator, Stylohyoid, and the posterior belly of the Digastric.

2. "The HUMERUS, or arm-bone, the largest and longest bone of the upper extremity, consists of a shaft, head, neck, greater and lesser tuberosities, and lower extremity.

The *shaft*, cylindrical above, flattened and prismoid below, becomes twisted in the middle, and presents: A rough triangular surface about the middle of its outer surface for insertion of the deltoid muscle, and a musculo-spiral groove for the musculo-spiral nerve and superior profunda artery, on each side of which arise the external and internal heads of the triceps muscle.

The *upper extremity* presents—the head, forming nearly a sphere, projecting upward, backward, and inward, articulating with the glenoid cavity; the anatomical neck, immediately beneath, is slightly grooved for the attachment of the capsular ligament; greater tuberosity, external to the head and lesser tuberosity, with three facets from before backward for attachment of supraspinatus, infraspinatus, and teres minor muscles; lesser tuberosity, smaller but more prominent than greater, is anterior to head, for the subscapular muscle; bicipital groove, passes downward and inward between the two tuberosities and lodges the long tendon of biceps; the anterior bicipital ridge, bounds the groove in front and receives insertion of pectoralis major muscle; the posterior bicipital ridge receives the latissimus dorsi and teres major; the surgical neck, including the head, neck, and both tuberosities; a rough impression near the center of the inner border for the coraco-brachialis muscle; nutrient canal, below and toward the lower end.

The *lower extremity* presents from within outward the following: Internal condyloid ridge, extending upward from the condyle; internal condyle, more prominent than external, gives origin to the flexors and pronator radii teres; epitrochlea, an eminence separating the trochlea from the internal condyle; trochlea, a pulley-like articulating surface for greater sigmoid cavity of ulna; coronoid fossa, a small depression bounding the trochlea in front, and receiving the coronoid of the ulna in flexion; olecranon fossa, a larger depression behind, and receiving the olecranon process of ulna in extension; supra-trochlear foramen, sometimes formed by perforation of one fossa into the other; radial head, or capitel-

lum, a smooth, rounded eminence articulating with cup-like depression on head of radius; external condyle, less prominent, gives origin to the extensors and supinators; external condyloid ridge, extending upward on the shaft from the condyle.

It *articulates* with three bones—scapula, radius, and ulna.

Its *muscular attachments* are twenty-five—subscapularis, supraspinatus, infraspinatus, teres major and minor, pectoralis major, latissimus dorsi, deltoid, coracobrachialis, brachialis anticus, triceps, pronators and flexors to inner condyle, pronator radii teres, flexor carpi radialis, palmaris longus, flexor sublimus digitorum, flexor carpi ulnaris, supinators and extensors to outer condyle, supinator longus, extensor carpi radialis longior and brevior, extensor communis digitorum, extensor minimi digiti, extensor carpi ulnaris, anconeus and subanconeous, supinator brevis." (Young's *Handbook of Anatomy.*)

3. SARTORIUS. *Origin*, from anterior superior spine of ilium; *insertion*, into inner surface of upper part of shaft of tibia, behind the anterior tubercle.

4. The *superficial palmar arch* is formed by the ulnar artery, and is completed by the ulnar artery anastomosing with a branch of the radial (superficial volar or princeps pollicis). It gives off the four digital branches.

The surface marking is a line drawn transversely across the palm from a point where the web of the thumb joins the palm.

The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries.

The surface marking is a line drawn transversely across the palm, one-half inch nearer the wrist than the superficial arch.

5. The *gall-bladder* is a conical bag placed in a fossa on the under surface of the right lobe of the liver. Its upper surface is attached to the liver, and its fundus and posterior surfaces are invested by peritoneum reflected from the adjacent surface of the liver. The body is in relation in front with the liver, and behind with the first part of the duodenum, the pylorus, and the hepatic flexure of colon. The fundus is in contact with the parietes opposite the ninth right costal cartilage. It is about four inches long, and holds about one ounce. Its duct passes from the neck of the gall-bladder downward, backward, and to the left to join the hepatic duct.

6. THE POPLITEAL SPACE is *bounded: Above, and externally* by the Biceps; *above, and internally* by the Semimembranosus and Semitendinosus; *below, and externally* by the Plantaris and external head of the Gastrocnemius; *below, and internally* by the inner head of the Grastrocnemius. *Contents:* Popliteal vessels with branches, external saphenous vein, external and internal popliteal nerves, small sciatic nerve, lymphatic glands, and loose areolar tissue.

7. The *patella* is a flat, triangular bone situated in front of the knee-joint; it is said to be a sesamoid bone developed in the tendon of the quadriceps extensor. Its anterior surface is convex and shows perforations for nutrient vessels; it is separated from the skin by a bursa. Its posterior surface is smooth and oval-shaped, and has two facets separated by a vertical ridge; these facets articulate with the two condyles of the femur. The superior border gives attachment to the rectus and crureus; the lateral borders give attachment to the vastus externus and vastus internus. The apex gives attachment to the ligamentum patellæ. The anterior surface is covered by the tendon of the quadriceps extensor, which is continuous below with the ligamentum patellæ.

It serves to protect the front of the knee-joint, and it increases the leverage of the quadriceps extensor muscle, by making it work at a greater angle.

8. The *third cranial nerve* is the motor nerve for the following muscles of the eye: Superior rectus, inferior rectus, internal rectus, levator palpebræ superioris, and inferior oblique.

9. *Prostate gland* is about 1½ x ¾ x ½ inches, and weighs about three-quarters of an ounce. It resembles a chestnut in size and form. It is situated at the neck of the bladder, and surrounds the first part of the urethra. It consists of fibromuscular (unstriated) tissue with imbedded follicular pouches, the whole enclosed in a firm fibrous capsule, continuous in front with the triangular ligament, and behind with the posterior layer of the deep perineal fascia. *Arteries* are from the vesical, hemorrhoidal and internal pudic.

RELATIONS OF PROSTATE. *Anteriorly:* Symphysis pubis, anterior ligaments of bladder, branches of dorsal vein of penis. *Posteriorly:* Rectum. *Laterally:* Levator ani. *Base:* Surrounds neck of bladder, seminal vesicles, and vasa deferentia. The *apex* rests on triangular ligament.

10. *Peyer's glands* are situated in the ileum, with a few in the jejunum, and occasionally in the duodenum.

PHYSIOLOGY.

1. The physiological composition of the blood is: Plasma, red corpuscles, white corpuscles, and platelets.

The *function of the red blood corpuscles* is to carry oxygen from the lungs to the tissues.

The *function of the white blood corpuscles* is:—(1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

The *function of the platelets* is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about 200,000 to more than 500,000 in each cubic millimeter of blood.

Plasma conveys nutriment to the tissue; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

2. The *red blood cells are formed* in bone marrow; in fetal life they are formed in "blood islands," and in spleen and liver.

White blood corpuscles are formed in the spleen, lymph glands, and lymphoid tissue; also from other white cells by direct cell-division in the blood stream; the eosinophiles may be derived from the bone marrow.

3. "True regeneration may occur in bone, tendon, nerves, and striped muscle. . . . Exudation of plasma from the neighboring blood vessels occurs, and its fibrinogen is converted into fibrin, so glueing the edges of the wound together. Leucocytes are poured out and infiltrate the wound, absorbing any blood clot present. These are followed by fibroblasts (connective-tissue cells), which take their place. New capillaries form by budding out from adjacent ones, and vascularize the new tissue. Fibrous tissue is formed by intercellular exudation from the fibroblasts and so the fibrocicatricial union is complete, for at the same time epithelium is spreading over the narrow surface line." —(*Aids to Surgery.*)

4. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged, the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.*

The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage.

The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) The vibration and closure of the auriculo-ventricular valves, (2) the muscular sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall.

The *second* sound is caused by the vibration due to the closure of the semilunar valves.

5. The secretory fibers of the facial nerve are distributed (by the chorda tympani) to the submaxillary, and sublingual glands.

6. "After an ordinary mixed meal the pylorus usually opens for the first time about half an hour after digestion begins, and some of the acid chyme passes into the duodenum. The action of this muscular ring is intermittent, and the explanation of its alternate openings and closings may be briefly summed up in the phrase used by Cannon: "The acid control of the pylorus." It is necessary that the food should be retained in the stomach until it is acid; otherwise it would not, on reaching the duodenum, give rise to the formation of secretin, the chemical stimulus for the flow of pancreatic juice, and bile. He has found that acid on the gastric side of the pyloric sphincter opens it, and acid in the duodenum closes it. As soon therefore as the chyme is neutralized by the alkaline juices of the duodenum there is no longer any hindrance to the action of the acid chyme in the pyloric end of the stomach in opening the door which was temporarily closed by acid on its duodenal side. This action does not occur if a ring is cut through the muscular coat immediately beyond the pylorus, and so the effect from the duodenum is a local reflex action mediated like the movements of the small intestine by the plexus of Auerbach."—(*Halliburton's Physiology.*)

7. The acid in the gastric juice, when it reaches the duodenum, causes the production of secretin; this latter is absorbed by the blood and carried to the pancreas, where it incites pancreatic activity.

8. *Digestion of fats.* In the stomach, the gastric juice dissolves the connective tissue binding the fat cells together, and sets free the fat, which passes into the duodenum. Here the steapsin of the pancreatic juice (aided by the secretions) splits up the fats into glycerin and fatty acids.

Absorption of fat. "Fat is not absorbed as fat, but

as glycerin and fatty acid or soap. It is generally accepted that the fatty acid set free in the intestine is dissolved by the bile salts, and in this way, together with the glycerin, is absorbed by the columnar cells, but that during absorption a lipase which is contained in the columnar cells re-synthesizes, by reverse action, the glycerin and fatty acid. In this way minute fat particles are found near the bases of the columnar cells, and these may be demonstrated by staining with a 1 per cent. solution of osmic acid. The fat globules are further taken up from the columnar cells by some of the lymphocytes, which are capable of exhibiting ameboid movements, and which are found in the lymphoid tissue between the columnar cells and the central lacteal. The fat is then deposited in the central lacteal by these ameboid cells, and in this way it gets into the general lacteal stream, and thence into the thoracic duct. The bile salts, which have been absorbed by the columnar cells, in all probability get into the portal vein radical, and in this way are taken back to the liver to be excreted again in the bile. After a fatty meal minute globules of fat may be demonstrated in the blood plasma of an animal; but they disappear rapidly, possibly existing in a soluble and invisible form absorbed to the blood proteins before they are deposited in the fat depots of the body."

9. *Function of the pituitary gland:*—"The *anterior* lobe is concerned with the process of growth, hypertrophy leading to overgrowth of the skeleton, and partial removal to failure of development of the body as a whole and of the sexual glands. Extracts of the *posterior* lobe, when injected into an animal, have a direct action on plain muscle all over the body; they cause constriction of the arterioles and a rise of blood pressure, contraction of the muscular coats of the digestive tract and of the bronchioles, and contraction of the uterus. The extracts also produce an increased flow of urine, which was at first attributed to the presence of a substance having a specific effect upon the renal cells; it is probable, however, that the diuretic effect is merely an indirect result of the more rapid flow of blood through the kidney which follows the injection of the extract. Extracts of the posterior lobe increase the secretion of milk, and after the injection a larger amount of milk is formed by the animal in the course of twenty-four hours." (Bainbridge and Menzies' *Essentials of Physiology.*)

10. EFFECT OF ATMOSPHERIC PRESSURE ON RESPIRATION. "*Effect of lowered pressure:*—When a person ascends

from near sea level to a height of 5,000 to 10,000 feet or more, he is apt to suffer from symptoms which are generally described as mountain sickness: these symptoms are headache, mental confusion, blueness of the lips, and nausea or vomiting. They may occur when the individual ascends to this height in a train, and are therefore not due to muscular exercise, although they may become more severe when exercise is taken. They are caused entirely by lack of oxygen. With increasing altitude the barometric pressure, and therefore the partial pressure of oxygen in the atmosphere and in the alveolar air, gradually fall; and when the alveolar pressure of oxygen falls to about 60 mm. Hg. the symptoms just described make their appearance. Similar symptoms are produced in animals and in man, when they are placed in closed chambers and the barometric pressure is gradually reduced. If the individual remains at a high altitude, the symptoms pass off in the course of a day or two, and after a time exercise may be taken without their recurrence. The adaptation of the body to the altered conditions is brought about by changes in both the circulatory and respiratory systems. In the first place the lack of oxygen leads to the passage into the blood of lactic acid, which stimulates the respiratory center; and the breathing becomes deeper, with the result that the partial pressure of carbonic acid in the alveoli decreases and that of oxygen rises. At a high altitude, when the alveolar oxygen pressure is low, even a small rise in the partial pressure of oxygen appreciably increases the extent to which hemoglobin can be saturated with oxygen as the blood passes through the lungs. . . . Secondly, a more gradual compensatory process takes place in persons who remain at a high altitude for a long period. The number of red corpuscles and the percentage of hemoglobin in the blood are increased, and the oxygen-carrying capacity becomes much greater.

The *effect of raised pressure.*—Men engaged in the building of bridges and tunnels are often compelled to work in caissons, which are filled with compressed air to prevent the inrush of water. They suffer no inconvenience, and the respiratory movements are not affected while they are in the caisson, even though the pressure may be three or four atmospheres. Under this pressure, however, the blood dissolves an increased amount of oxygen and nitrogen, and when a man leaves the caisson, and the pressure to which the blood and tissue fluids are exposed is reduced to one atmosphere, most of the nitrogen, previously in solution, is evolved

as bubbles, which may obstruct the flow of blood along the blood-vessels or through the heart. The symptoms caused by this obstruction, and known as caisson disease are very varied, and include paralysis, severe abdominal pain, and collapse. The disease is prevented by allowing the man to pass from the caisson into a special air chamber, in which the pressure is gradually lowered to that of the atmosphere so as to prevent any sudden evolution of nitrogen." (Bainbridge and Menzies' *Essentials of Physiology*.)

CHEMISTRY.

1. *The chlorine group:—*

ELEMENT	SYMBOL	ATOMIC WEIGHT	MOLECULAR WEIGHT
Fluorine	F.	19	38
Chlorine	Cl.	35.5	71
Bromine	Br.	80	160
Iodine	I.	127	254

2. BISMUTH. *Symbol*, Bi; *atomic weight*, 208.5; *valence*, 3; *physical properties:*—A hard, brittle, crystalline solid; usually contaminated with arsenic; combines directly with chlorine, bromine, and iodine; is only slightly oxidized in cold air; it dissolves in hot sulphuric and nitric acids, becoming, respectively, a sulphate and nitrate.

3. An *anhydrous* substance is one that contains no water. A *deliquescent* substance is one that has a tendency to absorb moisture from the air. An *efflorescent* substance is one that, if exposed to the air, loses its water of crystallization and falls to powder.

4. *Calcium chloride* is $CaCl_2$. *Chloride of lime* is either $CaCl_2 + Ca(ClO)_2$, or $CaCl(OCl)$.

5. Calomel is liable to be contaminated with corrosive sublimate; the presence of the latter may be detected by the formation of a black stain upon a bright copper surface immersed in the calomel, moistened with alcohol.

6. Organic compounds are chiefly composed of carbon, hydrogen, oxygen, and nitrogen.

7. An *alkaloid* is an organic, nitrogenized, basic substance, capable of combining with acids to make salts in the same way that ammonia does. Alkaloids are divided into two classes: (1) Volatile and (2) fixed.

8. The acidulous elements do not form salts with the oxyacids, and their hydrates are acids, and their oxides unite with water to form acids.

9. *Symptoms of poisoning by digitalis:* "Nausea, and occasionally vomiting. Sometimes colic and diarrhea. After two or three hours, marked diminution in the fre-

quency of the pulse, which may fall to 40 or even 25. Dyspnea, attended by a sense of oppression in the chest and coldness of the extremities. Headache, vertigo, and tendency to sleep. Usually attacks of syncope occur, provoked sometimes by the slightest movement of the patient. Death is generally by syncope, sometimes after several hours of coma succeeded by convulsions. *Treatment:* The patient must be kept strictly in the recumbent position. The stomach should be washed out with infusion of tea by the stomach tube. Stimulants should be given."—(Witthaus' *Essentials of Chemistry.*)

10. *Apomorphine* is morphine minus water. It is produced by heating morphine with hydrochloric acid to 150° C., under pressure.

BACTERIOLOGY.

1. To *prove that bacteria cause disease* it is essential: (1) That the microorganism be found in the tissues, blood, or secretions of a person or animal sick or dead of the disease; (2) the microorganism must be isolated and cultivated from these same sources; it must also be grown for several generations in artificial culture media; (3) the pure cultures, when thus obtained, must, on inoculation into a healthy and susceptible animal, produce the diseases in question, and (4) the same microorganisms must again be found in the tissues, blood, or secretions of the inoculated animal. These are called the rules or postulates of Koch.

2. *Effect of temperature upon bacteria:* As a rule bacteria will rarely grow below 16° C. and above 40° C. A few will grow at a temperature between 60° and 70° C. and are called thermophilic. Most bacteria are killed by temperatures above 60° to 75° C., but their spores can resist boiling water for some minutes, though killed by dry heat if exposed to 150° C. for an hour or to 175° C. for ten minutes. Cold inhibits the growth of, but does not destroy, bacteria; immersion in freezing mixtures kills many bacteria; but some bacteria and spores are capable of resisting intense cold. Bacteria usually grow best at room temperature; many of the pathogenic bacteria grow best at body temperature and some at a temperature a little above that of the body.

3. *How* antitoxin produces immunity and effects cure is not known, but *theories* deduced from observed facts are as follows: "As the various pathogenic bacteria produce the causative toxins of their respective diseases, so the organic cells of the body, reacting under the stimulus of the poisons thus introduced, immediately proceed to elaborate defensive bodies, which if produced in suffi-

cient quantity will neutralize the effects of the toxins. Residual antibodies remaining in the blood after recovery render the animal immune for a time against the disease. The immunizing and curative effects obtained by the injection of the blood serum of an immunized animal into the circulation of another animal are due either to direct chemical neutralization of the toxins themselves by the antibodies so introduced (Behring, Kitasato), or to a particular influence exerted by the antibodies upon the living cells of the organism which, being affected in two opposite directions, remain neutral to the disease (Buchner). Some authorities hold that these results are due to the conjoint action of leucytic and chemical forces. Ehrlich's sidechain theory assumes that every toxin contains toxophore molecules having direct toxic action, and haptophore molecules which combine the toxophores with a similar combining group of molecules in the tissue cell of the attacked organism. The tissue cell molecules being destroyed by the toxophores, a rapid and profuse regeneration of similar molecules occurs in side chains, and these molecules overgrowing are carried into the circulation, becoming the antitoxin, which acts by combining with the haptophores of newly-arrived toxin, using up their combining power before they can reach the tissue cells."—(Potter's *Materia Medica*, etc.)

4. The *bacterial findings in puerperal septicemia* include the *Streptococcus pyogenes, Staphylococcus pyogenes, gonococcus, Bacillus coli communis, Bacillus diphtheriæ Bacillus ærogenes capsulatus, and Bacillus typhosus.*

5. *The Widal reaction:* "Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. . . . A positive reaction is obtained when all the bacilli present gather in one or two masses of clumps, and cease their rapid movement inside of twenty minutes."—(From Thayer's *Pathology.*)

6. The *microscopic blood findings in pernicious ane-*

mia: Diminution in the number of red blood corpuscles (this may be excessive, as low as 500,000 per cubic millimeter); the hemoglobin is also diminished, but not so markedly as the number of red cells; normoblasts, megaloblasts, microcytes, and macrocytes may be found; crenation and poikilocytosis may be observed; there is no leucocytosis.

7. To *determine the opsonic power of the blood:* "For this estimation it is necessary first to prepare a quantity of living human leucocytes from some indifferent source (either the patient or some normal individual), from which the plasma has been completely removed. This is done by receiving the blood, as it exudes from a needle puncture, into a weak solution of sodium citrate, centrifugalizing the mixture thoroughly, pipetting off the citrated plasma, adding normal saline solution to the deposited mass of red cells and leucocytes, mixing thoroughly and again centrifugalizing. A repetition of this "washing" with normal saline and the subsequent removal of the supernatant fluid leaves a sufficient quantity of leucocytes and cells entirely freed from the fluid (which possibly contained excess of opsonin) in which they were originally suspended. Next a small quantity of blood to be tested is collected in a small pipette and allowed to clot, and the serum is separated. Similarly the serum from the normal individual or "control" is prepared. Finally a homogeneous suspension of the test-bacterium is prepared by emulsifying some of the bacterial growth in distilled water and carefully centrifugalizing, in order to throw down any possible clumps or masses of microorganisms. By means of a suitable measuring pipette, equal quantities of washed cells, of bacterial emulsion and of the patient's serum are taken up and thoroughly mixed, and the mixture incubated at body temperature for fifteen minutes. At the end of this time, after preliminary manipulations to ensure that there is thorough incorporation of the mixture, blood-films are spread there—from on an ordinary glass slide, fixed, and stained. A second mixture, in which the normal serum is substituted for the patient's serum, is prepared in an identical manner. The two slides are examined microscopically, and the number of bacteria taken up and ingested by the first fifty consecutive polymorphonuclear leucocytes encountered in each film is noted. The ratio between the resulting sums is then expressed in the form of a fraction, of which the total contents of the fifty cells mixed with the patient's serum forms the numerator, and that of those with the normal serum the denominator. This fraction is, however, usu-

ally expressed as a percentage of unity—which is represented by the normal serum. Thus, supposing 150 bacteria were counted in fifty cells of the preparation made from the patient's serum, and 100 in a similar number in the preparation from the normal control, the index would be represented by $\frac{150}{100}$ or 1.5. If, however, the specimens chosen had given the figures 60 and 90 respectively, the fraction would have been $\frac{60}{90} = 0.66$."—(Bosanquet and Eyre's *Serums, Vaccines and Toxins.*)

8. Three or four bacteria to a leucocyte would be a fair average.

9. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue.

10. *Diseased conditions excited by the gonococci:* Gonorrhea, ophthalmia neonatorum, arthritis, tenosynovitis, perichondritis, subcutaneous abscess, intramuscular abscess, salpingitis, pelvic peritonitis, adenitis, pleuritis, endocarditis, septicemia, acute cystitis, chronic cystitis, pyonephrosis, and diffuse peritonitis.—(From McFarland's *Bacteriology.*)

PATHOLOGY.

1. "*Fatty infiltration* is the deposit of fat within the cell or intercellular tissues. May be general or local. It may occur in cells that normally contain no fat, or else appear in excess in cells that do contain it. The fat contained within the cells is made up of neutral palmitin, olein, and stearin.

"*Glycogenic infiltration* is a deposit of glycogen within the cells. It is found normally in small amount throughout the body except in the mammary glands and central nervous system. It is greatest in amount in the

cells of the liver, in voluntary muscles, and in the kidneys; is also present normally in the blood, both in the plasma and in the cells, particularly the polymorphonuclear leucocytes. It is also commonly found in malignant tumors of the mesodermic origin (sarcomata). The origin of the glycogen is not clear; it is a carbohydrate, but seems to be derived from proteid and carbohydrate substances. Glycogen is most frequently found in the condition known as diabetes.

"*Serous* or *edematous infiltration* is a condition of dropsy of the cells. All kinds of cells may be involved, but it is most common in the epithelial. It is an absorption of an excess of plasma by the cells.

"*Pigmentary infiltration* is the deposit of pigment within the tissues. According to their origin, pigments may be divided into four classes: (1) Those derived from outside of the body; (2) those formed from hemoglobin and its derivatives, the hematogenous pigments; (3) the hepatogenous or biliary pigments; (4) metabolic pigment; that resulting from cellular activity within the body is known as melanin.

"*Calcareous infiltration* or *calcification* refers to the deposit of earthy salts within the tissues. It occurs in consequence of a deficiency of oxygen and an excess of carbon dioxide in the tissue juices, which causes a deposit of the carbonates and phosphates of magnesium and calcium. Oxalates are also generally present. This process occurs only in those tissues that are either completely destroyed or else undergoing degeneration as a result of imperfect nutrition."—(McConnell's *Manual of Pathology.*)

2. "Catarrhal appendicitis is accompanied by a mild degree of leucocytosis, rarely above 12,000. An increasing leucocytosis, from 15,000 upward, generally indicates a severe infection. In some cases of severe catarrhal appendicitis one may find a count of 25,000 to 30,000. If the count remains stationary, it is indicative of a walling off. If the leucocyte count decreases gradually in a mild attack, it signifies improvement. If it decreases suddenly after a severe attack, it signifies either gangrene, perforation with beginning peritonitis, or the rupture of an abscess into the general peritoneal cavity. The majority of cases in which perforation or gangrene occurs early, and causes peritonitis, have a low leucocyte count, owing to the lack of resistance on the part of the organism and the overwhelming of the system by the toxins.

Gibson believes that with a moderate rise of the total leucocytosis there should be, in favorable cases, a mod-

erate rise of the polynuclear cells only, showing that the infection is localized and absorption is limited. On the other hand, if there is only a moderate leucocytosis with a notable increase in the polynuclear cells, it indicates almost unquestionably that there is either a severer form of lesion or less resistance to absorption, or that both conditions exist."—(Eisendrath's *Surgical Diagnosis.*)

3. FORMS OF SARCOMA. (1) *Round-celled:* Embryonic or immature connective tissue. Blood-vessels without walls, or thin-walled, ramifying among the cells. Small or large round cells, embedded in a small amount of granular or homogeneous intercellular substance. (2) *Spindle-celled:* Cells varying much in size, spindle-shapcd, with long, fine tapering extremities, separated by very little intercellular substance. Often have a fibrous appearance (Recurrent Fibroid). (3) *Giant-celled* (*Myeloid*): Masses of protoplasm containing two or more nuclei—up to 20 or 50—with a varying amount of round and spindle cells. (4) *Alveolar:* Alveolar space filled with sarcoma cells; the trabeculæ composed of spindle-cells. (5) *Melanotic:* Sarcomata of various kinds in which brownish or black pigment becomes deposited as amorphous granules in the cells as well as the connective tissue and blood-vessel walls of the tumor.—(*Cyclopedia of Medicine and Surgery.*)

4. *Anaphylaxis* is a condition of supersensitization induced by the injection of a serum. It is the opposite of prophylaxis, and in place of rendering the person injected immune the serum has made him particularly susceptible. It has been followed in some instances by alarming symptoms, such as: Heart failure, collapse, convulsions, coma.

5. "The exact cause of pellagra is unknown. . . . The anatomical changes are not constant. In the spinal cord degeneration of the posterior and lateral tracts occur. The intestinal lesions consist in some instances of ulcerations, but are inconstant. The frequent occurrence of amebæ has been noted. The other lesions are those commonly found in all chronic wasting diseases."—(French's *Practice of Medicine.*)

6. "*Chronic interstitial nephritis* may sometimes be secondary to chronic parenchymatous nephritis, connective-tissue overgrowth having become marked, and resulting in contraction of the kidney. Usually, however, it is a primary affection, and is known as renal cirrhosis, red granular, granular, or contracted kidney. In the diffuse form the kidney is reduced in size, it may be to one-third the normal or less, is hard and markedly

granular. The capsule is adherent, leaving a rough surface on removal. Small cysts are often present on the surface filled with urine or colloid. The kidney is hard on section, the cortex much reduced in width, and cysts may be scattered through its substance. The color is reddish with whitish mottling, and in gouty cases there may be whitish striæ, due to deposits of urate of soda. *Microscopically*, the lesions are principally seen in the cortex; at first patches of cellular infiltration appear, then the intertubular connective tissue becomes increased and fibrous, with destruction of glomeruli and the corresponding tubules. The glomerular epithelium becomes swollen and desquamates, Bowman's capsules may be much thickened by concentrically arranged layers of nucleated fibrous tissue, and the Malpighian bodies in places may be converted into nodules of fibrous tissue, in others into cysts. The corresponding tubules undergo atrophy with disintegration of their epithelium; here and there multiplication, with convolution of the tubules, may be present, suggesting an adenomatous formation. There is everywhere an increase of the stroma, in the cortex and pyramids, between the tubules, and around the glomeruli and vessels, with pronounced round-celled infiltration or well-formed fibrous tissue, in which calcification may occur. The vessel walls are thickened, chiefly owing to an endarteritis. Lardaceous infiltration may accompany the interstitial nephritis."—(Hewlett's *Pathology*.)

7. *Atrophic cirrhosis of the liver.* "In a well-marked case the liver is smaller than normal and presents both marked induration and shrinking, the new connective tissue being disposed in large bands which run in various directions and by their contraction divide the organ into many irregular lobes. When these latter are small they project above the surface and resemble nail heads, hence the name "hob-nail" liver, sometimes applied. Owing to the arrangement of the fibrous bands the condition is sometimes called "multilobular," since many acini at a time are grouped and constricted by it. The liver tissue, sharply circumscribed, presents a yellow color if fatty, and with admixture of bile pigment may be darker. The capsule may be thickened or adherent to the diaphragm, the gall-bladder presents no constant appearance except that it is often empty. Adhesions form between the abdominal walls and contents and tend to relieve the portal stasis for a time.

"*Microscopically* the formation of connective tissue may be traced in all its stages in the line of the portal subdivisions, in the youngest places appearing as a

focus of round cells about the sheath of the veins with later development of spindle cells. These foci blend and the fibrous tissue becomes poor in cells and firmer, coincident with contraction. This causes compression of the portal capillaries and at the same time there is often an obliterating endophlebitis; the result is to offer an obstacle to the entrance of the portal blood, with increasing stasis throughout the origins of the system. This explains many of the clinical symptoms, the ascites, gastric and intestinal catarrh and hemorrhage, piles, and distention of superficial abdominal veins (caput medusæ), to which latter effect ascitic distention adds. Jaundice, however, appears later if at all and the spleen is not swollen till toward the end."—(Thayer's *Pathology.*)

8. "In *acute bacillary dysentery* the principal changes in the intestinal mucous membrane are: (1) Intense hyperemia, the mucosa being swollen, corrugated, and here and there hemorrhagic. (2) Necrosis, and fibrinous exudate, with formation of a pseudo-membrane. (3) Ulceration, at first on the summit of the folds, but extending both deeply and laterally.

"In *chronic bacillary dysentery* the mucosa is thickened and granular, and the whole gut is thickened. There are chronic ulcers with thickened edges, and areas of scar tissue. Consequently there are partial strictures of the bowel, which is dilated above. A typical dysenteric ulcer therefore has the following characters: (1) Site; on the ridges of the large intestine. (2) Edges; irregular and thickened. (3) Base; may be formed of any of the coats. (4) Tendency to contraction on healing. The so-called 'diphtheritic dysentery' is a form in which necrosis is very extensive and the development of pseudo membrane pronounced. In advanced cases the whole mucosa may form 'a black, rotten, friable, charred mass' (Rokitansky).

"In *amebic dysentery* the lesions are chiefly seated in the large intestine. They present—(*a*) small gelatinous swellings of the mucosa, with partial ulceration; (*b*) necrosis and sloughing of the underlying tissues. The ulcers of amebic dysentery thus have undermined edges. The amebæ are found in the ulcerating mucosa, but more abundantly in the tissues beyond the ulcerated area (submucous or muscular coat), where they set up edema and necrosis. Later, along with the ulcers, cicatrices, leading sometimes to partial stricture, may be found." (Wheeler and Jack's *Handbook of Medicine.*)

9. ACUTE SIMPLE ENDOCARDITIS. *Causes:*—"It is usually secondary to some other affection, particularly acute

articular rheumatism (especially in young people), chorea, pleurisy, pneumonia, pericarditis, Bright's disease, and the infectious fevers such as scarlatina, influenza, and diphtheria. Gonorrhea is an occasional cause. Cachectic states such as accompany tuberculosis and cancer are predisposing causes. It may be secondary to chronic endocarditis.

Pathology.—"Acute simple endocarditis may be prenatal as well as postnatal. In the former class of cases, the right side of the heart is usually involved, while in those instances observed after birth the disease is most often limited to the left side. While the disease may attack the entire lining membrane of the heart it is especially marked at the valvular portions of the endocardium. The earliest change is that of hyperemia of the membrane, rendering it red and swollen. As the inflammatory exudate is thrown out the surface of the valves become roughened and warty excrescences are formed. These verrucose formations are to be found on the auricular surface of the mitral valve and on the ventricular surface of the aortic valve at the line of contact of their leaflets, usually from 1 to 2 mm. from their free margin. These vegetations are produced by a proliferation of the cells of the adventitia and of the external connective tissue; fibrin from the blood is deposited on the formations, thus serving to increase their size. The excrescences are friable and may be easily detached or broken off and carried in the blood stream as emboli, to various parts of the body, particularly the left side of the brain, the kidneys, and the spleen. If retained in position fibrous tissue is eventually formed; the valves become thickened and contracted producing chronic endocarditis. The leaflets may then become the seats of various infiltrations."—(Hughes's *Practice of Medicine.*)

10. *Conditions favoring cerebral hemorrhage:*—Age, syphilis, gout, alcoholism, rheumatism, uricacidemia, arterial sclerosis, increased arterial tension, Bright's disease, overexertion.

OBSTETRICS.

1. The chief differences between the male and female pelvis are thus tabulated in Morris's *Anatomy:*

MALE.	FEMALE.
Bones heavier and rougher.	Bones more slender.
Ilia less vertical.	Ilia more vertical.
Iliac fossæ deeper.	Iliac fossæ shallower.

MALE.	FEMALE.
False pelvis relatively wider.	False pelvis relatively narrower.
True pelvis deeper.	True pelvis shallower.
True pelvis narrower.	True pelvis wider.
Inlet more heart-shaped.	Inlet more oval.
Symphysis deeper.	Symphysis shallower.
Tuberosities of ischia inflexed.	Tuberosities of ischia everted.
Pubic arch narrower and more pointed.	Pubic arch wider and more rounded.
Margins of ischiopubic rami more everted.	Margins of ischiopubic rami less everted.
Obturator foramen oval.	Obturator foramen triangular.
Sacrum narrower and more curved.	Sacrum wider and less curved.
Capacity of true pelvis less.	Capacity of true pelvis greater.

2. *External pelvimetry.*—"The measurements are made with a pair of calipers. *Interspinous diameter.*—The points of the calipers are held in the two hands so that the point of the forefinger rests alongside the point of the instrument. The two anterior superior spines are located, and the points placed on them. The calipers are then screwed tight by an assistant or nurse, and the measurement read off. Normally it is 9½ to 10 inches. *Intercristal diameter.*—The instrument is held as before and the points passed slowly round the iliac crests until the points of greatest separation are found, when the measurement is made. Normally it is 10½ to 11 inches. The *external conjugate diameter* is measured by placing the one point of the calipers over the tip of the last lumbar spine, and the other over the front of the symphysis pubis. This is most easily done with the patient standing, and the tip of the last lumbar spine can be found by counting downwards from above. It is, however, usually marked by a slight dimple due to fascial attachments. In fat persons it suffices to make a point in the mid line 2½ inches above the line joining the posterior superior iliac spines. The external conjugate usually measures about 7½ to 8 inches; 3½ inches at the very least must be allowed for the thickness of the bony and soft tissues. Therefore, while a large reading may not necessarily mean a large conjugate, a reading under 7½ inches, and more especially under 7 inches, indicates that the conjugate is diminished proportionately.

"*Internal pelvimetry.*—The *diagonal conjugate* from the promontory of the sacrum to the under margin of the symphysis may be measured by the fingers. The diagonal conjugate measures 4½ to 4¾ inches, and ½ to ¾ of an inch must be subtracted to give the length of the conjugata vera. The actual amount to be subtracted varies with the depth of the pubic bone and its inclination toward the sacrum, so that at the best this method of estimation is but approximately correct. In practice, however, these methods are found to be sufficiently accurate in the vast majority of cases. It should be remembered that in a normal pelvis it is impossible to touch the promontory of the sacrum by vaginal examination without forcing the fingers so far in as to hurt the patient. Therefore if the promontory can be felt readily it indicates a small pelvis and the desirability of more careful investigation. The *outlet of the pelvis* can be directly measured in both its anteroposterior and transverse diameters by means of the fingers and a measuring tape, or more conveniently by means of a pair of calipers with the points crossed."—(Johnstone's *Textbook of Midwifery.*)

3. "The *urine* should be examined at regular intervals throughout pregnancy. This examination should be both chemical and microscopical, and made at least once a month for the first six months, and once a week during the last four. The presence of albuminuria, the evidences of toxemia, edema, renal insufficiency, or nephritis, demand daily examinations. This examination should determine the amount of urine passed in twenty-four hours, its specific gravity, the total amount of urinary solids, the percentage of urea, the presence or absence of albumin or sugar and of tube casts."—(Polak's *Manual of Obstetrics.*)

4. *Methods of determining the position of the fetus prior to labor:*—"The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies,—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and, to confirm this fact, the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the

in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for 10 days, after which a full tub-bath at 98° F. should be given daily for 6 months. The temperature may then be reduced to 95° F., and at the end of a year to 90° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting powders should be used to prevent chafing."—(*Pocket Cyclopedia.*)

Ophthalmia neonatorum is an infectious, purulent inflammation of the conjunctiva in the newborn, due to the gonococcus or other pyogenic germ; produced by contact of the eye with the vaginal secretion of the mother during labor, or infected fingers, or instruments, etc. *The treatment is* (1) *Prophylactic.*—Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 or 2 per cent. solution of nitrate of silver, immediately after birth. (2) *Remedial.*—Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burned.

9. PHLEGMASIA ALBA DOLENS is a form of manifestation of puerperal sepsis in which there is a thrombosis of the iliac or femoral vein. Sometimes it occurs after a uterine phlebitis, in which clots are carried from the uterine sinuses to the hypogastric veins, where they cause obstruction to the blood flow in the crural veins. The trouble may also begin as a crural phlebitis. It is thus due either to cellulitis or to thrombosis. It usually appears about the third or fourth week of the puerperium. *Symptoms:* Irregular chilliness and malaise, pain in leg and abdomen, rigor and swelling of leg, fever, skin is white and tense, and the vein feels hard. *Treatment:* Rest in bed, support patient's strength, relieve pain, and apply lead and opium wash to take down the inflammation.

10. GONORRHEA. *Symptoms:* Pain and burning in the vulva; pain and burning on micturition; dyspareunia;

faction; and whether they *crepitate* on pressure (as they will *after* respiration). Take out lungs with heart attached, and place them in pure water having temperature of surrounding air. Note whether they float (high or low), or sink (slowly or rapidly). Separate them from the heart and weigh them accurately; then place them in water again, and note sinking or floating, as before. Subject each lung to pressure with the hand, and note sinking or floating again. Cut each lung in pieces and test floating again. Take out each piece, wrap it in a cloth, and compress with fingers as hard as possible, and test floating, etc., as before. The crucial test of *perfect respiration* is each piece floating after the most vigorous compression." (King's *Manual of Obstetrics.*)

7. In addition to the bath, clean clothes, and other details which may be taken for granted in persons of refinement, the physician should, before making a vaginal examination, carefully cleanse his hands, as scrupulously as if he were about to undertake a major operation. The hands should be scrubbed for at least five minutes with hot water, soap, lysol, and a nail brush that has been boiled or soaked for some time in an antiseptic. Special care must be given to the nails and nail-folds. The hands should then be soaked for three minutes in an antiseptic solution such as bichloride of mercury 1:1000. This is followed by another washing in sterile water. Rubber gloves that have been boiled and kept sterile and a sterile gown add to the safety of the patient.

The patient should receive a full bath before labor begins and all bed-clothing and personal clothing should be clean. If there are any pathological discharges from the genitals, the vagina should be thoroughly scrubbed with tincture of green soap and hot water, followed by a mercuric chloride douche (1:2000); this followed by a douche of sterile water. The physician's hands should be scrubbed for ten minutes with tincture of green soap and hot water, followed by alcohol, and immersion in mercuric chloride (1:100). All instruments should be boiled for ten minutes or immersed in mercuric chloride 1:1000 for half an hour. Examinations should be made when necessary to determine the position, presentation, size of the fetus, etc.

8. *Care of infant:* After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, 1 or 2 drops of a 1 per cent. solution of silver nitrate should be instilled

in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for 10 days, after which a full tub-bath at 98° F. should be given daily for 6 months. The temperature may then be reduced to 95° F., and at the end of a year to 90° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting powders should be used to prevent chafing."—(*Pocket Cyclopedia.*)

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10. GONORRHEA. *Symptoms:* Pain and burning in the vulva; pain and burning on micturition; dyspareunia;

yellowish or greenish discharge, in which the gonococcus can be found; the vagina is hot, red, swollen, and tender. *Possible results:* Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomata of vulva, abscess of Bartholin's glands. *Diagnosis* is made from the symptoms, particularly from finding the gonococcus in the discharge. It is *so serious*, on account of the possible results, enumerated above; it often leads to chronic invalidism, and may be the cause of death.

Treatment: Rest, if possible in bed; freedom from alcoholic or sexual excitement; a mild and unirritating diet; salines and diuretics; plenty of water to drink; a warm sitz bath; douching of vagina with about a gallon of a 1:5000 bichloride solution, or of borax (1 dram to the quart), or of potassium permanganate (1 per cent. solution); the douche is to be taken in the recumbent position.

DISEASES OF WOMEN.

1. In the nulliparous adult the uterus is about three inches long, about two inches wide at the upper part, and about one inch thick. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity, and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments. (1) *Broad ligaments*, which extend outward on each side from the side of the uterus to the side of pelvis. (2) *Rectouterine ligaments*, which extend backward from the intraperitoneal portion of the cervix uteri to the peritoneal investment of the rectum. (3) *Round ligaments*, which extend from the uterus just below the Fallopian tubes, through the inguinal canal to the labia majora. (4) The *ovarian ligaments*, which extend from the superior part of the uterus, behind the Fallopian tubes, to the inner end of the ovary. (5) The *uterosacral ligaments*, which extend from the highest part of the cervix uteri to the sides of the sacrum opposite the lower border of the sacroiliac synchondrosis.

2. *Menorrhagia* is an excessive loss of blood at the menstrual periods. *Local causes:* Uterine displacements, malignant disease, inflammations of uterus or appendages, fibroids, cystic degeneration of the cervix, subinvolution, ectopic gestation, abdominal tumors.

General causes: Hemophilia, scurvy, purpura, malaria, anemia, mitral disease, diseases of kidneys, or liver, acute infectious fevers.

Treatment: Remove the cause, if possible; treat abnormal conditions that are present; vaginal douches, tampons, and curettage have been recommended; also ergot, hamamelis, hydrastis, and viburnum prunifolium; rest in bed is necessary. Intrauterine applications of astringents or of adrenalin have been used.

3. *The usual cause of menorrhagia in virgins* is some general systemic condition; but uterine congestion, polypi and fibroids must not be forgotten.

4. *Chronic endometritis* is a chronic inflammation of the mucosa lining the uterus. *Causes:* Debility, repeated pregnancies, laceration, and subinvolution of uterus, fibroids, gonorrhea, or sepsis. *Symptoms:* Neuralgic, bearing-down pains; cramps; dysmenorrhea; irritable bladder; menorrhagia or metrorrhagia; leucorrhea, which may be blood-stained or purulent; profuse hydrorrhea; loss of appetite, constipation, dyspnea, palpitation, sterility. The uterus as a whole is abnormally tender; the uterine cavity is enlarged; the external os is patulous, and shows a tendency to bleed on being touched. *Treatment:* The general health must be attended to; rest is indicated; constipation must be avoided; tonics are of slight use; ergot is useful for the menorrhagia or metrorrhagia; vaginal douche, pessaries, hip-baths, and counterirritation have all been recommended; curettage may help; and one or both lips of the cervix may be amputated.

5. *Urethral caruncle* is a small red fleshy growth generally situated on the posterior part of the meatus of the urethra. There are local pain and tenderness, which may be excessive; a burning sensation is experienced on urination; it may bleed. The proper treatment is to excise it or destroy it with the thermocautery.

6. The main support of the uterus is the perineum, chiefly the sling of muscles and fascia which surrounds the vagina and its opening.

7. The *main object in repairing the perineum* is to prevent atrophy of the injured muscles, subinvolution and prolapse of the uterus.

8. *Operation for lacerated perineum:* "The labia are seized with Allis' forceps at the level of the lowest carunculæ myrtiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis forceps and the guide stitch in opposite directions outward and down-

ward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double tier suture of chromic gut, two half hitches being taken in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transverse perinei and bulbocavernosus muscles are brought together by silkworm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal stitches are knotted; they are removed on the twelfth day."—(Hirst's *Obstetrics.*)

9. *Pyosalpinx* is a condition in which the Fallopian tube is distended with pus as the result of a salpingitis which has become purulent. The *treatment* of the acute form consists in rest in bed, free purgation with Rochelle salts (5i every hour), hot vaginal douches, and hot applications to the abdomen. If the symptoms become more severe celiotomy is indicated. The chronic form may be treated during the menstrual period by rest in bed, free purgation, hot vaginal douches, local applications of iodine to the cervix and vaginal vaults, and glycerin tampons. If these measures fail removal of the tube and ovary and replacing the retroverted uterus, etc., are necessary.

10. *Cancer of the body of the uterus is diagnosed* by the history, symptoms, physical signs, and microscopic examination. It is a disease of advancing years, and generally occurs after the menopause; nulliparæ and multiparæ are equally liable. The chief symptoms are hemorrhage and discharge with an offensive odor, pain, and cachexia. The cervix is soft, the uterus enlarged, and tender. The uterus must be curetted, and the scrapings examined by the microscope.

SURGERY.

1. *Shock* is the name given to a sudden and general depression of the vital powers, due to some strong stimulation (such as injury or emotion), acting on the vital centers in the medulla and producing vasomotor paralysis. Shock is *primary* when the symptoms appear

promptly; it is *secondary* when the symptoms don't appear for several hours (often observed after railway accidents, intoxication, etc.). *Treatment of shock:* Place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermically, may be necessary for the relief of pain. Adrenalin and pituitrin have been used with benefit. It is often very difficult to differentiate shock from hemorrhage; but as a rule, in shock the symptoms are at their worst immediately after the injury, and tend to improve with time; and the nervous symptoms are more prominent from the first (dilated pupils, unconsciousness, etc.).

The following table (from Eisendrath's "Surgical Diagnosis") gives the diagnosis: (See table, page 225.)

2. *Fracture* is a solution in the continuity of a bone, caused by violence.

Dislocation is more or less sudden and persistent separation of two articular surfaces.

FRACTURE	DISLOCATION.
1. Crepitus may be present.	1. Crepitus never present.
2. Preternatural mobility.	2. Rigidity rathen than mobility.
3. Easily reduced—but	3. Difficult to reduce—but
4. Deformity more liable to recur after reduction.	4. Deformity less liable to recur after reduction.
5. The head of the bone is in its proper place.	5. The head of the bone is not in its proper place.
6. The socket containing the head of the bone is not empty.	6. The socket which should contain the head of the bone is empty.
7. When rotated the bone does not move as one piece.	7. When rotated the bone moves as one piece.

The *cardinal principles in the treatment of fractures* are: Reduction, coaptation, immobilization, and suitable measures for promoting the nutrition of the part and for preventing adhesions in the neighboring joints and muscles. Compound fractures, in addition, demand: Asepsis, removal of foreign matter or damaged tissues, stopping the hemorrhage, and measures to combat shock.

Kocher's method of reduction is: to flex the forearm,

COMA FROM INTRACRANIAL INJURY.	APOPLECTIC COMA.	UREMIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Deep coma; may have history of onset after fall or injury. Evidence of fracture of vertex or base.	Deep coma; sudden onset. If any injury, only a scalp wound.	Deep coma. Slow onset unless convulsions have preceded the coma.	Can be aroused by supraorbital pressure unless very profound.	Can be aroused unless very deep.
Pupil dilated on side of lesion. Choked disc.	Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Albuminuric retinitis.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse very slow.	Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse rapid.	Pulse more rapid than normal and full.	Pulse rapid, may be irregular.
Respiration slow and stertorous.	Respiration slow and irregular.	Respiration frequent and irregular.	Regular respiration.	Respiration very slow —may be 6 to 8 per minute.
Temperature higher—101°.	Temperature higher on paralyzed side, but lower in rectum.		May be low or normal.	
Urine normal or contains trace of albumin.	Urine contains trace of albumin, but may be same as in uremia.	Urine shows albumin, casts, and low urea percentage.	Normal.	Normal.
Hemiplegia on opposite side to that of injury. If contusion of brain is also present, may have generalized convulsions.	Hemiplegia with convulsions on one side.			

press the elbow to the side, rotate the arm outward. Bring the arm forward and upward to a right angle with the body, then rotate inward, while the elbow is brought down over the body so that the fingers sweep the opposite shoulder.

3. *Amputation in contiguity* is amputation at a joint. *Amputation in continuity* is amputation elsewhere than at a joint.

Conditions which justify amputation of a limb are: "Any injury, disease, or malformation rendering retention of the limb incompatible with life or comfort; avulsion of limb; compound fracture; compound dislocation; fracture with great comminution of bone; laceration of important vessels; extensive contusion; extensive laceration; gunshot injuries; aneurysm; effects of heat and cold; gangrene; extensive bone disease; tumors; elephantiasis; tetanus; snake bite; deformities."—Bickham's *Operative Surgery.*)

4. *Degrees of Burns.*—Dupuytren's classification: *First degree*, reddening of the skin. *Second degree*, blistering. *Third degree*, destruction of the epidermis, Malpighian layer, and papillæ of the derma. The sensitive nerve terminals are exposed; consequently this is the most painful degree. The sweat and sebaceous glands and hair follicles are not destroyed, and from these epithelium spreads in healing, so that repair is rapid, and the scar is not a contracting one. *Fourth degree:* the whole thickness of skin and part of the subcutaneous tissues are destroyed. *Fifth degree:* the muscles are injured. *Sixth degree:* the whole limb is charred.

Treatment.—General: If carbonic-oxide-poisoning is present, artificial respiration and administration of oxygen. For the relief of shock, opium and stimulants are called for.

Local: For burns of the first degree, powder with boracic acid. Puncture blisters, and cover the part with an antiseptic dressing.

Burns of deeper degrees than the second must be made aseptic with 1 in 1,000 perchloride of mercury. Carbolic acid is absorbed readily, and must not be used. Antiseptic gauze dressings should then be used. Picric acid (20 grains to 1 ounce of water) is used as a dressing. It lessen the pain, and can be left on two or three days. The continuous bath may be used. If the burn be of any size, it should be skin-grafted, as the scars of burns contract very much, and may produce deformities. —(*Aids to Surgery.*)

Opium is not contraindicated.

5.

REDUCIBLE SCROTAL HERNIA.	CONGENITAL HYDROCELE.	HYDROCELE OF CORD.
Impulse on coughing.	No impulse, unless combined with hernia.	No impulse, unless actually in abdominal ring.
Percussion clear if intestinal, dull if omental.	Percussion dull.	Percussion dull.
Ring and inguinal canal occupied, spermatic cord obscured.	Ring and canal clear.	Ring and canal usually clear.
Intestine to be felt, and returned with slip and gurgle, and remains up till effort is made, when it returns from above.	Fluid to be felt, and readily returned when patient lies down, and reappears slowly when he stands up, filling from below.	Small, ovoid, elastic tumor, connected with but movable upon spermatic cord.
Opaque.	Translucent.	Translucent.
Testicle below tumor.	Testicle behind tumor.	Testicle below tumor.
Any age.	Childhood.	Childhood.

—(Heath's *Surgical Diagnosis.*)

IRREDUCIBLE SCROTAL HERNIA.	HYDROCELE.
Sausage-shape.	Pyriform.
Intestine clear, omentum dull on percussion.	Dull on percussion.
Intestinal or knotty in feel, according to contents.	Elastic or fluctuating.
Testicle below tumor.	Testicle behind tumor.
Opaque.	Translucent.
Sudden.	Chronic.

—(Heath's *Surgical Diagnosis.*)

Hernia is a protrusion of an internal viscus through an abnormal opening in the parietes.

Bassini's operation: "An incision 2½ inches long is made over the inguinal canal, exposing the structures of the cord and the external oblique. The external oblique fibers are split from the apex of the external ring to ex-

pose the canal. The sac is found, opened, emptied of its contents, and isolated from the structures of the cord up to the internal ring. If the hernia is irreducible, the intestine is freed and returned to the abdomen, omentum being ligatured and removed. The neck of the sac is then transfixed and tied with silk, and the fundus removed. The stump returns to the abdomen, three or four stitches are then passed through the conjoined tendon and arched fibers of the internal oblique and transversalis muscles above, and the deep part of Poupart's ligament below. These are tied behind the cord. The external oblique is then sutured in front of the cord, leaving just sufficient opening for it to pass through without pressure. The skin is then closed by a continuous stitch. The patient should be kept in bed for three weeks, and should not exert himself for at least six weeks. If the wound has suppurated, or if the case is one in which the abdominal muscles are weak, it is advisable that a light truss should be worn afterwards for six months."—(From *Aids to Surgery.*)

6. FISTULA IN ANO.—*Classification:* There are four varieties: (1) The *complete,* which opens into the rectum internally and on the perineum externally; (2) the *external incomplete* or *blind external,* which opens on the perineum but not into the rectum; (3) the *internal incomplete* or *blind internal,* which opens into the rectum but not on the perineum; (4) the *horseshoe* fistula, which extends around the rectum and opens on each side. The internal opening is generally between the two sphincters, but may be above the internal sphincter and below the external sphincter. There may be several pockets or side tracts extending in different directions.

Treatment: This consists in "the conversion of the fistula into an open wound so that it may heal from the bottom. A grooved director is passed through the fistula into the rectum, and the overlying tissues severed with a bistoury. The sphincter should never be cut more than once, because of the danger of incontinence. All branching sinuses likewise should be opened, and all fibrous tissue, with undermined skin, cut away with scissors. The bleeding is then checked, and the wound packed with iodoform gauze. If the fistula is lined with mucous membrane it must be completely excised. A blind external fistula may be excised and the wound sutured. A blind internal fistula may be converted into a complete one and treated as above. The bowels are confined for the first three or four days and the wound dressed after each defecation, being irrigated with cre-

olin and repacked with iodoform gauze."—(Stewart's *Surgery*.)

7. *Congestion* is excess of blood in the more or less dilated blood vessels of a part.

Inflammation is the name given to the series of changes occurring in a part as the result of injury, provided that the injury is not sufficient to kill the part.

An *aneurysm* is characterized by a pulsation, which is expansive; if firm pressure is made on the artery above the aneurysm the pulsation ceases and the swelling disappears; on relaxing this pressure the pulsating enlargement promptly reappears. Pressure on the artery below the aneurysm causes the enlargement to increase in size; by placing a stethoscope over the aneurysm, a bruit may be heard. In the case of an *abscess* over a vessel, there may be a transmitted pulsation, but it is not expansive; the pulsation ceases when the abscess is lifted away from the vessel; pressure on the proximal side does not cause the growth to disappear; there is never a true bruit.

Abscess should be opened as soon as possible.

Aneurysm is treated *medically*, by lowering the diet, especially the quantity of fluid; iodide of potassium or calcium chloride may be given. *Surgically*, complete extirpation of the sac is advised; or ligature of the artery, or compression of the artery may be tried.

8. "*Treatment of empyema* should be undertaken without delay. Aspiration seldom cures, but may be undertaken where the dyspnea is great, and an anesthetic given afterwards for the excision of a piece of rib. Drainage is always necessary, and is best done by excising a portion of the fifth or sixth rib in the mid-axillary line. The patient should be allowed to come round quickly from the anesthetic, so that the coughing which occurs will expel the masses of coagulated lymph and help to expand the lung. A big drainage-tube is then inserted. Daily dressings are necessary, but irrigation of the cavity is seldom needed. If, because of delay in treatment the cavity does not soon close, Estlander's operation, or some modification, must be performed. The wound must be enlarged and a number of ribs exposed, and sufficient of them removed to convert the cavity into a pyramidal one, the base of which is the open wound. This is packed with gauze and allowed to heal from the bottom. If the operation has to be extensive, the flaps are allowed to fall back upon the granulating surface of the lung, and in these cases marked scoliosis and weakness of that side of the chest follows."—(*Aids to Surgery*.)

HYGIENE.

1. *Temperament* is the character of a person's physical constitution as affected by his mental disposition.

Idiosyncrasy is a special peculiarity of temperament or constitution which makes a person different from other persons.

Diathesis is a bodily condition by virtue of which a person is specially liable to certain diseases.

2. A *virus* is the specific poison of an infectious disease. Vaccine lymph is also called a *virus*.

3. *Parasitic diseases that may be caused by eating insufficiently cooked meats:* Infection by tapeworm, by trichina, and by echinococcus.

4. *In the management of lobar pneumonia* "ordinary ventilation is not enough. It is often better to place the bed directly at an open window, day and night, the patient being allowed to breathe the pure cold air; but his body should be protected from the cold by warm, light coverings. It is often better, when possible, to have the patient out of doors, in a tent, on a veranda or roof, and when this cannot be done, he should be given the benefit of the open air for a few hours each day. The relief experienced by the patient in a severe condition from removal to the open air is remarkable, and it undoubtedly makes recovery possible in many cases that are hopeless without it."—(French's *Practice of Medicine.*)

5. *Period of infectivity of diphtheria.* "The length of time during which a patient who has suffered from diphtheria may remain infectious is very variable. The bacillus has been found to be absent from the throat as early as the end of the second week. In view of the uncertainty which attends the recovery of the bacillus from the throat it is well to consider that all patients are infectious for at least six weeks, and no child should be allowed to return to school until eight weeks have elapsed from the beginning of treatment."—(McClure's *Handbook of Fevers.*)

6. The patient must be isolated; no one but the physician and nurse must enter the room; the physician should put on a large washable gown when he goes in, and remove it on leaving, at the same time washing his hands in a disinfectant; the nurse, when she leaves the sick room should also remove her clothes and put on others, at the same time disinfecting herself. At the termination of the disease everything should be disinfected; toys and books, etc., are better burned.

7. A *disinfectant* is an agent which restrains infec-

tious diseases by destroying or removing the micro-organisms which cause them.

8. *Formaldehyde* is a good surface disinfectant, has poor penetrating qualities, does not destroy fabrics and injure objects, and is non-toxic. *Sulphur dioxide* damages textile fabrics, tarnishes metal objects, and is very poisonous.

To disinfect a room by formaldehyde: (1) By Trillat's apparatus, which "allows the solution of formalin to flow in a fine stream through a copper coil heated to redness by a flame beneath, and the gas and vapor passing directly into the room. The apparatus may be operated outside of a room, and the amount of gas liberated depends directly upon the strength and quantity of the solution evaporated. (2) In Schering's method the solid paraform is heated in a receptacle over an alcohol lamp, and is especially valuable in disinfecting small rooms, closets, etc. (3) The cheapest and most common form develops the gas directly by the oxidation of methyl alcohol, the vapors of the latter passing over and through tubes or coils of heated metal. The amount is uncertain and results indefinite." —(*Cyclopedia of Medicine and Surgery.*)

To *fumigate by sulphur dioxide:* For each 1,000 cubic feet of space, three pounds of sulphur are burned, care being taken to prevent accidents. In all cases all apertures and crevices of the room should be closed, all closets, drawers, or other receptacles opened; and after the fumigation the room should be well ventilated and thoroughly cleansed with a solution of corrosive sublimate.

9. *Diseases, the prevention of which would lengthen the average of human life:* Tuberculosis, typhoid, pneumonia, syphilis, gonorrhea, malaria, yellow fever, diphtheria, influenza, cerebrospinal meningitis, septicemia, pyemia, dysentery, cholera, plague, smallpox, measles, scarlet fever, hydrophobia, leukemia, endocarditis, hypertrophy of the heart, angina pectoris, heart-block, arteriosclerosis, aneurysm, asthma, pneumokoniosis, emphysema, pleurisy, empyema, gastric ulcer, gastric cancer, appendicitis, constipation, cirrhosis of liver, abscess of liver, cholecystitis, gallstones, tumors of pancreas, peritonitis, nephritis, pyelitis, diabetes mellitus, alcoholism and addiction to drugs, various poisonings, sunstroke, and industrial diseases.

10. *Bubonic plague* is an acute infectious disease associated with glandular enlargement, and due to the *Bacillus pestis* which is conveyed by fleas on rats.

To prevent the spread of the disease, the following

routine was followed in Glasgow, during the epidemic of 1900: "(1) Within the infected area, ashpits were emptied thrice weekly and washed once a week with chloride of lime solution. (2) Back courts were hosed every night with chloride of lime solution. (3) A special inspection of the district was undertaken for the detection of dirty houses, entries, etc., and for the overcrowding of houses. (4) Medical inspection of the district was carried out and the inhabitants of infected buildings and all 'contacts' were offered injection with Yersin's serum or Haffkine's vaccine, while all suspected cases were visited with their own medical attendants. (5) Handbills were distributed offering the service of the medical staff at any time. (6) the crews of all ships were inspected on arrival in port. (7) Fumigation of infected houses was carried out by liquefied SO_2 for twelve or twenty-four hours, after which the house was entered and all articles of bedding, clothing, etc., were wetted with a 2 per cent. solution of formalin (1 gallon of a 40 per cent. solution of formaldehyde to 50 gallons of water), removed to the sanitary wash-house, and then boiled or steamed. All articles which could not be boiled or steamed were burned. (8) All houses where cases had occurred or from which contacts were removed were sprayed with the formalin solution, as were also the lobbies and entries. (9) Clinical demonstrations were given daily to medical practitioners at the hospital. (10) A pamphlet descriptive of the varieties of the disease was distributed among the medical practitioners of the city. (11) Physicians to out-patients at the various hospitals were specially circularized. (12) A campaign against rats was entered upon; rat-catchers were engaged and the bodies of rats were investigated for the signs of plague. The sewers of the hospital were treated with liquefied SO_2, and the rats driven from the hospital by this method. (13) The bodies of those who died from plague were drenched with formalin and enclosed in an airtight leaden shell before burial. (13) The holding of wakes over any dead bodies was prohibited."—(McClure's *Handbook of Fevers.*)

STATE BOARD EXAMINATION QUESTIONS.

ILLINOIS STATE BOARD OF HEALTH.

ANATOMY.

1. Name the classes into which the vascular system is divided. Give the anatomical structures of each class.

ILLINOIS.

2. Give the three forms of articulations, with one example of each.
3. Name the ligaments of the temporo-maxillary articulations.
4. Name the muscles of the arm, giving the origin of each.
5. What is the longest muscle in the body? Give its origin and insertion.
6. Name the coronary arteries. Where do they arise and terminate?
7. Name the branches of the axillary artery.
8. What does the foramen magnum transmit?
9. Name the lobes, fissures, and arteries of the liver.
10. Where and into what does the great sciatic nerve divide?

MATERIA MEDICA AND THERAPEUTICS.

1. Give the dose, mode of administration, uses, and dangers of apomorphine hydrochloride.
2. Define local anodyne. Name one and describe its use.
3. Name three antacids, give dose and therapeutic indications.
4. Define diuretic, name three and explain use and mode of action of one of them.
5. Classify each of the following according to its therapeutic use: Camphor, morphine, nitrite of sodium, veronal, ergot.
6. Name two drugs which increase the hemoglobin of the blood. Give dose and use.
7. Name two drugs which are alleged to increase the coagulability of the blood. Give uses.
8. Name two drugs which lower blood pressure, giving dose, mode of administration, and uses.
9. Name two diaphoretics and give physiological action of one of them.
10. Name five drugs used for reducing or lowering the temperature in fever, giving dose of each.

CHEMISTRY.

1. Define briefly the following terms: Matter, force, energy, and law of Avogadro.
2. Explain the terms radicle and residue, also reaction and reagent.
3. Name some uses of phosphorus. Give one test for phosphorus in case of poisoning. How many oxides of phosphorus?
4. State chemical action of nitric acid. Complete the following formula: $C_6H_6 + HNO_3 =$
5. (a) Name some of the characteristic properties

of hydrocarbons. (b) Give formula for marsh gas. (c) Complete the formula $6Cu + CS_2 + 2H_2O =$

ETIOLOGY AND HYGIENE.

1. Give the etiology of Hodgkin's disease.
2. Give the etiology of cirrhosis of the liver.
3. Give the etiology of rheumatic fever.
4. Briefly discuss the prophylaxis of trachoma.
5. What hygienic conditions should exist in a manufacturing plant employing 3,000 men and 800 women, to protect and maintain the health of the employees?

PATHOLOGY.

1. Describe the pathology of arthritis deformans.
2. Give the gross pathology of acute lobar pneumonia.
3. Name six pus-producing cocci in the order of their virulence.
4. Describe the pathology of pyonephrosis.
5. Describe the pathology of chronic parenchymatous nephritis.

BACTERIOLOGY.

1. Name some of the important pathogenic diplococci.
2. What are the important pathogenic bacteria found in sputum.
3. Give the bacteriology of syphilis.
4. Give the technique of the Widal test.
5. Describe the blood findings (microscopic) in a case of pernicious anemia.

PHYSIOLOGY.

1. How is heat produced in the body, and how is it given off from the body?
2. Explain dangers of transfusing blood from lower animals into man.
3. What is meant by "physiological leucocytosis" and under what conditions found?
4. Discuss functions of (*a*) proteins, (*b*) carbohydrates, (*c*) fats, (*d*) salts, (*e*) water, all of which constitute food.
5. What physical and chemical changes take place in a muscle during contraction?
6. Give origin and function of the bile.
7. Name parts of (*a*) small intestine, (*b*) large intestine.

NEUROLOGY.

1. Define and give etiology of acute ascending paralysis.

2. By which nerves is the heart controlled?
3. Where are the speech areas situated?

PHYSICAL DIAGNOSIS.

1. Describe herpes zoster.
2. Give differential diagnosis between acute bronchitis and lobar pneumonia.
3. How would you determine high blood-pressure? What is its significance?
4. Give physical signs of aortic regurgitation.
5. Give distinctions between organic and functional heart murmurs.

OPHTHALMOLOGY AND OTOLOGY.

1. Differentiate between trachoma and conjunctivitis.
2. Describe, in detail, how you would treat a chemical burn of the eyeball.
3. Give symptoms, etiology, and probable serious results of mastoiditis.

PEDIATRICS.

1. Give differential diagnosis between measles and scarlet fever.
2. Give cause and treatment of "summer diarrhea."

PRACTICE.

1. Give the diagnosis and treatment of lobar pneumonia.
2. Outline the modern treatment of syphilis in the acute stage.
3. Give the differential diagnosis of cirrhosis of the liver.
4. Give the treatment of la grippe and its complications.
5. Give the treatment of tapeworm.
6. Give the treatment of the conditions in which headache is a prominent symptom.
7. Give the treatment of constipation.
8. Give the diagnosis, cause and treatment and prognosis in locomotor ataxia.
9. Differentiate endocarditis from pericarditis and give the cause and treatment of the former.
10. Give the cause and treatment of chronic rheumatism.

SURGERY.

1. Outline briefly the surgical diseases of the third nerve.
2. Outline the technique of tendon transplantation.
3. Name the structure in which rodent ulcers most commonly develop, and give surgical treatment.

4. Give etiology of delayed fracture union.
5. Outline the best method for male sterilization.
6. Describe the bloodless operation for amputation at the hip.
7. Give etiology and treatment of tenosynovitis.
8. Name five forms of talipes and give attitude of foot in each.
9. Name the principal blood-vessels and nerves, severed in wrist amputation.
10. Under what conditions may a wound be closed without drainage?

OBSTETRICS.

1. Name and give location of female organs of generation.
2. Describe and give function of ovaries.
3. What is the composition of liquor amnii, and what is its function?
4. From what structure does hydatidiform mole develop?
5. What are the anomalies of the placenta?
6. Describe congenital umbilical hernia, and outline treatment.
7. Name the objective signs of pregnancy at the fifth month.
8. Give treatment for edema of the vulva during pregnancy.
9. Name the positions and presentations in order of their occurrence.
10. Give etiology and treatment of mastitis.

GYNECOLOGY.

1. Give the etiology of metrorrhagia.
2. Give the differential diagnosis between appendicitis and ovaritis.
3. How would you diagnose extrauterine pregnancy, and what are the indications for operation?
4. What are the principal causes of incontinence of urine in women, and the indications for treatment in each case?
5. What are the causes of procidentia uteri?
6. Give the differential diagnosis of uterine fibroids.

LARYNGOLOGY AND RHINOLOGY.

1. Give the diagnosis and treatment of abscess of antrum of Highmore.
2. Give the indications for laryngotracheotomy and describe operation.

ILLINOIS.

MEDICAL JURISPRUDENCE.

1. At post-mortem, how would you determine a child was born alive?

2. Give the symptoms of poisoning by mercuric chloride, and state how it can be demonstrated in a fatal case.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

ILLINOIS STATE BOARD OF HEALTH.

ANATOMY.

1. The VASCULAR SYSTEM is divided into two classes: (1) The *blood-vascular system*, which consists of the heart, arteries, capillaries, and veins, and (2) the *lymph-vascular system*, which consists of the lymph glands and lymph vessels.

2. The *three forms of articulations* are: (1) *Synarthrosis*, or immovable articulation, such as that between the two parietal bones. (2) *Amphiarthrosis*, or mixed articulation, such as that between the two pubic bones. (3) *Diarthrosis*, or freely movable articulation, such as that between the humerus and the ulna.

3. *Ligaments of the temporomaxillary articulation* are: External lateral, internal lateral, stylomaxillary, and capsular; with an interarticular disc of cartilage.

4. The *muscles of the arm* are: *Coracobrachialis* (origin from coracoid process of scapula), *Biceps* (origin from coaracoid process of scapula, and upper margin of glenoid cavity of scapula), *Brachialis anticus* (origin from outer and inner surfaces of shaft of humerus, beginning at about the level of the insertion of the deltoid), *Triceps* (origin from below the glenoid cavity of the scapula, from posterior surface of shaft of humerus and external border of humerus above the musculospiral groove, also from posterior surface of shaft of humerus and internal border of humerus, below the musculospiral groove), and *Subanconeus*, which is really the name of some of the fibers of the lower part and under surface of the triceps.

5. The longest muscle in the body is the *Sartorius*. It arises from the anterior superior spine of the ilium, and is inserted into the upper part of the inner surface of the shaft of the tibia.

6. The *right and left coronary arteries of the heart*, arise near the commencement of the aorta; the right, from the anterior sinus of Valsalva; and the left, from

the left posterior sinus of Valsalva; these two arteries anastomose in the substance of the heart. The *superior and inferior coronary arteries of the face* are branches of the facial artery, and run along the upper and lower lips respectively; each one anastomoses with its fellow of the opposite side. The *coronary artery* is also a name for the gastric artery, a branch of the celiac axis, which supplies the stomach.

7. *Branches of the axillary artery:* Superior thoracic, acromiothoracic, long thoracic, alar thoracic, subscapular, posterior circumflex, and anterior circumflex.

8. The *foramen magnum* transmits: The lower part of the medulla oblongata and its membranes, the spinal portion of the spinal accessory nerves, the vertebral arteries, the anterior and posterior spinal arteries, and the occipitoaxial ligaments.

9. The *lobes of the liver* are: Right lobe, left lobe, lobus quadratus, lobus caudatus, and Spigelian lobe (the last three are subdivisions of the right lobe). The *fissures of the liver* are: Umbilical fissure, fissure for the ductus venosus, transverse fissure, fissure for the gall-bladder, and fissure for the inferior vena cava. The *arteries of the liver* are: The hepatic artery, with the two branches into which it subdivides, the right and left hepatic arteries.

10. The *great sciatic nerve* generally divides at about the lower third of the back of the thigh into the internal popliteal and external popliteal nerves.

MATERIA MEDICA AND THERAPEUTICS.

1. APOMORPHINE HYDROCHLORIDE. Dose 1/30 grain (expectorant); 1/10 grain (emetic). It is usually *administered* by hypodermic injection. *Uses:* To produce vomiting, as an expectorant (in bronchitis). *Danger:* Collapse.

2. A *local anodyne* is an agent which, when applied to a part, is capable of relieving pain in that part. Heat is a local anodyne; it may be applied in the form of hot water, by compresses, hot packs, or by immersing the part in hot water; dry heat and steam are also used.

3. *Three antacids:* Sodium bicarbonate, potassium bicarbonate, and magnesia.

Sodium bicarbonate, dose gr. xv, is sedative to the gastric nerves, and is used in dyspepsia, hyperacidity, and acid diarrhea (of infants); it is applied locally in burns, ivy poisoning, and to allay itching.

Potassium bicarbonate, dose gr. xxx, is used in dyspepsia, hyperacidity, gout, and rheumatism.

Magnesia, dose gr. xxx, is used for acidity, sick headache, and mild digestive disturbances.

4. *Diuretics* are agents which promote the secretion of urine. *Three diuretics:* Water, digitalis, potassium acetate. *Potassium acetate* acts as a diuretic by stimulating the renal epithelium, and causing hyperemia of the kidneys, thus increasing the water in the urine. It is used in gouty and rheumatic conditions.

5. *Camphor* is a cardiac stimulant; *morphine* is a hypnotic anodyne and antispasmodic; *nitrite of sodium* is a vascular dilator; *veronal* is a hypnotic; *ergot* is used to cause contraction of the pregnant uterus, also of the muscle fibers in arteries (in case of hemorrhage).

6. *Two drugs which increase the hemoglobin of the blood:* Iron and perhaps arsenic.

Iron. Mass of ferrous carbonate, dose gr. iv; used in chlorosis.

Arsenic. Dose of liquor potassii arsenitis, ♏ iij, to be increased; used in anemic conditions.

7. *Two drugs which are alleged to increase the coagulability of the blood:* Calcium chloride and gelatine. Said to be useful in cases of internal hemorrhage and in hemophilia.

8. *Two drugs which lower blood pressure:* Nitroglycerin and amyl nitrite. *Nitroglycerin* is given by mouth or hypodermically in doses of ♏ 1; *amyl nitrite* is inhaled, dose ♏ 3. *Nitroglycerin* is used in cases of chronic nephritis with high blood pressure, also in anticipated attacks of angina pectoris. *Amyl nitrite* is used in angina pectoris, epilepsy, and cardiac dyspnea.

9. *Two diaphoretics:* Pilocarpine and Dover's powder.

Action of pilocarpine: "Especially stimulates the terminations of the secretory nerves, the first effect being a marked increase of the saliva; also stimulates unstriped muscle generally (with the exception of that of the blood vessels), and particularly in the intestine, causing violent peristalsis. The heart is at first accelerated and then slowed, and the blood-pressure first rises and then falls. The pupil is contracted, and spasm of accommodation occurs. The effects on the central nervous system are mainly depressing; they appear late and are quite overshadowed by the peripheral effects. This drug is the most efficient sudorific known, and with the exception of the diaphoresis its most important effects are the salivation and the myosis. In consequence of the hyperemia of the skin caused by it, the temperature may be tem-

porarily elevated, but the evaporation of the sweat soon produces a decided fall."—(Wilcox's *Materia Medica.*)

10. *Five drugs used for reducing or lowering the temperature in fever:* Acetanilide, gr. iv; antipyrine, gr. iv; acetphenetidine, gr. vij; quinine sulphate, gr. iv; and salicylic acid, gr. vij.

CHEMISTRY.

1. *Matter* is that which occupies space.

Force is that which produces, or tends to produce, motion or change of motion of matter.

Energy is the capacity to do work and also the exertion of doing work.

Law of Avogadro: Equal volumes of all gases, under like conditions of temperature and pressure, contain equal numbers of molecules.

2. *Radical* is a group of atoms which can enter or leave a chemical reaction, and behave in general as a single atom.

Radical of an acid is obtained by the subtraction from the acid of a number of hydroxyls equal to the basicity of the acid.

Residue of an acid is that which remains after removing the replaceable hydrogen.

Reaction is the interaction of two or more substances with chemical union or decomposition; also, the evidences of chemical decomposition afforded by changes in color, solubility, state or shape.

Reagent is a substance used to bring about a reaction.

3. *Uses of phosphorus:* In making matches, rat paste, and phosphor bronze.

Mitscherlich's process for detecting phosphorus: "This process is based upon the property of unoxidized phosphorus of becoming luminous in the dark. The matters supposed to contain the poison are rendered fluid by dilution with water, and acidulated with sulphuric acid. They are placed in a flask upon a sand bath, and the flask connected with a Liebig's condenser, which is placed in absolute darkness. Upon heating the flask any phosphorus present is volatilized, and, condensing in the tube, forms a luminous ring. This reaction is very delicate, and the appearance of the ring is proof positive of the presence of unoxidized phosphorus."—(Witthaus' *Essentials of Chemistry and Toxicology.*)

There are *two oxides of phosphorus*, the trioxide, P_2O_3, and the pentoxide, P_2O_5.

4. *Nitric acid* is decomposed on exposure to air and

light or to strong heat; it is an oxidizing agent; it dissolves many metals, forming nitrates.

$$C_6H_6 + HNO_3 = C_6H_5NO_2 + H_2O.$$

5. *Hydrocarbons* are gaseous (the first four members of the methane series), liquid (the next ten or eleven), and the remainder are solid; they are lighter than water and are insoluble in water, but soluble in alcohol, ether, and liquid hydrocarbons.

Formula for *marsh gas* is CH_4.

$$6\,Cu + CS_2 + 2\,H_2O = 2\,Cu_2S + 2\,CuO + CH_4.$$

ETIOLOGY AND HYGIENE.

1. The *etiology of Hodgkin's disease* is unknown.

2. *Etiology of cirrhosis of the liver:* Irritants taken to the liver by the blood; alcohol, and certain infectious diseases.

3. *Etiology of rheumatic fever* is unknown; probably some diplococcus, staphylococcus, or streptococcus.

4. *Prophylaxis of trachoma:* "The patient and his family must be warned of the contagiousness of the secretion, and impressed with the necessity for keeping the patient's handkerchiefs, towels, wash basin, etc., apart from those of other persons. In schools, asylums, institutions, and barracks, the prevention of epidemics of trachoma is a very serious matter, requiring constant vigilance, careful inspection of every new addition or inmate, and the isolation of trachoma cases so long as the latter are capable of conveying the disease." —(May's *Diseases of the Eye.*)

5. "In addition to the ordinary hygiene of factories and workshops, such as proper space, air, ventilation, water supply, lighting, heating, drainage and plumbing, ordinary cleanliness, and absence of dust, care should be taken that women and children do not work too long at a time or at occupations involving the use of poisonous or deleterious materials; that there are ample toilet and lavatory accommodations, and that these are separate and away from those used by men; there should also be opportunity to sit, and women should not be expected to remain standing for long periods of time."—(Scott's *State Board of Physiology and Hygiene.*)

PATHOLOGY.

1. *Pathology of arthritis deformans:* "The cartilage cells proliferate and burst into the joint, leaving the matrix, which has become fibrillated, looking like coarse velvet or plush. The softened cartilage is worn away at the points of pressure, and the underlying bone be-

comes hard and polished (eburnated). In spite of this hardness, the bone becomes worn away and perhaps grooved. At the same time there is overgrowth of the cartilage at their margins, which produces 'lipping,' while new bone is formed underneath. These osteophytes may lead to impairment of mobility, or may become broken off and form loose bodies in the joint. The synovial membrane is thickened and its villi hypertrophied. Cartilage may develop in the synovial fringes, and then, if detached, another type of loose body in the joint is formed. Effusion may or may not be present."—(*Aids to Surgery.*)

2. *Lobar pneumonia.* (1) *Stage of engorgement.*—This is the stage of inflammatory hyperemia and edema, and it is characterized microscopically by overfullness and slight tortuosity of the pulmonary capillaries, and by swelling of the alveolar epithelium. The lung is of a dark red color; it is heavier and less crepitant than natural; it pits on pressure; and its cut surface yields a reddish, frothy, tenacious liquid.

(2) *Red hepatization.*—Here there is an exudation of liquor sanguinis and blood-corpuscles. The exuded liquids coagulate within the alveoli and terminal bronchioles, the coagulum enclosing numerous white and a few red blood-corpuscles. The alveolar epithelium is swollen and granular. The lung is now much heavier than in the preceding stage, and is increased in size, so as to be often marked by the ribs. It is quite solid; sinks in water, and cannot be artificially inflated. It is remarkably friable, breaking down with a soft granular fracture. The cut surface has a markedly granular appearance, seen especially when the tissue is torn, and due to the plugs of coagulated exudation-matter which fill the alveoli. The color is of a dark reddish-brown, often here and there passing into gray. This admixture with gray sometimes gives a marbled appearance. The pleura covering the solid lung always participates more or less in the inflammatory process. It is opaque, hyperemic, and coated with lymph.

(3) *Gray hepatization.*—This stage is characterized by a continuance of the process of inflammatory cell-emigration, and by more marked changes in the epithelium. The white blood corpuscles continue to escape from the vessels, and the alveolar epithelium becomes more swollen and granular. The alveoli thus become more completely filled with young cell-forms, so that the fibrinous exudation is no longer visible as an independent material. The fibrinous exudation now disintegrates, and the young cells rapidly undergo fatty

metamorphosis. The alveolar walls themselves, with few exceptions, remain throughout the process unaltered, although very occasionally, when this stage is unusually advanced, they may be found here and there partially destroyed. Owing to these changes, the reddish-brown color of the lung becomes altered to a grayish or yellowish white. The granular appearance is much less marked; the solid tissue is much softer and more pulpy in consistence, and a puriform liquid exudes from the cut surface of the organ. This stage, when advanced, has been termed 'suppuration or purulent infiltration' of the lung."—(Quain's *Dictionary of Medicine.*)

3. *Six pus-producing cocci: Streptococcus pyogenes, Staphylococcus pyogenes aureus, Staphylococcus pyogenes albus, Staphylococcus pyogenes citreus Gonococcus, Streptococcus erysipelatis.*

4. *Pathology of pyonephrosis:* "The kidney presents a number of abscess cavities, the intervening parenchyma being pale and tough as a result of chronic interstitial nephritis. Unless there has been antecedent hydronephrosis the pelvis is usually small in proportion to the greatly enlarged and flask-shaped calyces, which constitute the abscess cavities and form the chief bulk of the kidney. Their communications with the pelvis and with each other are narrowed or obliterated, so that they may be regarded as separate cavities. The purulent contents are often mixed with crumbly masses of phosphates. The mucous membrane of the pelvis and calyces is converted into granulation tissue, and, in advanced cases, becomes the seat of ulceration which eats into the parenchyma. The renal blood-vessels are thickened and narrowed by endarteritis, so that there may be very little hemorrhage when the pedicle is divided. The perinephric cellular tissue is converted into granulation and scar tissue, and is frequently the seat of scattered foci of suppuration, and sometimes a large perinephric abscess is found to communicate directly with one of the dilated calyces. The perinephric suppuration may extend into the psoas and quadratus muscles, or into the cellular planes of the abdominal wall."—(Thomson and Miles' *Manual of Surgery.*)

5. In *chronic parenchymatous nephritis* both degenerative and proliferative changes are seen. The tubular epithelium is always more or less affected, showing signs of cloudy swelling, fatty degeneration, desquamation, and disintegration, most marked in the convoluted tubules, but also present in the loops and collecting tubules. The distribution of these changes is usually

patchy, giving rise to mottling of the cortex. The lumina of the tubes may be dilated, and contain granular and fatty matters, and hyaline casts, the latter formed by coagulation of exudation in the tubules. The glomeruli may occasionally appear normal, but there is almost always some swelling and hyaline degeneration, together with some proliferation and desquamation of the epithelium, so that they become highly cellular. Occasionally the glomerular changes may be more marked than the tubular; fatty degeneration of the glomerular and capsular epithelium may be prominent, or there may be swelling, proliferation, and desquamation of the epithelium, or both these changes may be combined. The glomerular vessels may be compressed, their endothelium degenerate, and they may be obstructed by leucocytes or by hyaline thrombi, and finally obliterated. Interstitial changes, though present, are not conspicuous, and consist of edema, and scattered foci of round-celled infiltration about the glomeruli and veins. Sometimes hemorrhages are evident in some of the glomeruli and the corresponding tubules. Lardaceous infiltration frequently accompanies parenchymatous nephritis.

BACTERIOLOGY.

1. *Pathogenic diplococci: Diplococcus meningitidis, Diplococcus gonorrhœæ, Diplococcus pneumoniæ, Diplococcus catarrhalis.*

2. *Pathogenic bacteria found in sputum:* Tubercle bacilli, streptococci, staphylococci, pneumococci, Friedlander's bacilli, influenza bacilli, and *Micrococcus catarrhalis.*

3. Syphilis is due to infection by the *Treponema pallidum.* This is a slender spirillum, with regular turns, the curves varying in number from three or four to twelve or even twenty; it is about 4 to 20 mikrons long, actively motile, with a fine flagellum at each pole; it is flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur.

4. Widal's test in typhoid fever "depends upon the fact that serum from the blood of one ill with typhoid fever, mixed with a recent culture, will cause the typhoid bacilli to lose their motility and gather in groups, the whole called 'clumping.' Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and trans-

ported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. * * * A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps and cease their rapid movement inside of twenty minutes."—(From Thayer's *Pathology*.)

5. In *progressive pernicious anemia:* The marked feature of the disease is pronounced oligocythemia. This progresses rapidly, and in ordinary cases the number of red corpuscles sinks to 1,000,000 or less per cu. mm.; at the same time, changes in size (microcytes and megalocytes) and in shape (poikilocytes) make their appearance and reach grades rarely attained in other diseases. Nucleated red corpuscles are always present in some number, and are usually abundant. The largest forms (megaloblasts) as a rule predominate, but in some cases the smaller forms are more abundant. Karyokinetic figures may be found in the nuclei. Polychromatophilia is generally present. The leucocytes may be decreased or normal in number; in the late stages leucocytosis is not uncommon, and it may become extreme. The larger mononuclear leucocytes are usually more abundant than in health, and myelocytes often occur in considerable numbers. In the terminal leucocytosis of pernicious anemia the lymphocytes often predominate.

PHYSIOLOGY.

1. *Heat is produced in the body* by: (1) Muscular action; (2) the action of the glands, chiefly of the liver; (3) the food and drink ingested; (4) the brain; (5) the heart; and (6) the thermogenetic centers in the brain, pons, medulla, and spinal cord. *Heat is given off from the body* by: (1) the skin, through evaporation, radiation, and conduction; (2) the expired air; (3) the excretions—urine and feces.

2. *Dangers of transfusing blood from lower animals to man:* "The serum of certain animals possesses the property of dissolving the red corpuscles of another species of animals. The serum of a dog destroys the red corpuscles of a man; the hemoglobin is dissolved out. The serum, besides its action on the red corpuscles, is also active against the white corpuscles of

the same animal, stopping their ameboid movements. The globulicidal action of the serum is related to its poisonous action on microbes. The normal serum of certain animals kills microbes, as the serum of the dog kills the typhoid bacilli. The power to kill red corpuscles and microbes is due to the presence in the serum of a substance, an alexin. In transfusion this plays an important part."—(Ott's *Pathology.*)

3. *Physiological leucocytosis* is an increase in the number of the white blood corpuscles occurring under normal or physiological conditions, such as: Digestion, exercise, after a cold bath, or during pregnancy.

4. *Function of proteids:* Formation and repair of tissues and fluids of the body, regulation of the absorption and utilization of oxygen, formation of fats and carbohydrates, production of energy. *Function of carbohydrates:* Production of heat and energy and formation of fats. *Function of fats:* Supply of heat and energy, supply of fatty tissues, nutrition of nervous system. *Function of salts:* Support of bony skeleton, supply of HCl for digestion, regulation of nutrition and energy. *Function of water:* It enters into the composition of all the tissues and fluids of the body, it moistens the surfaces and membranes of the body, it keeps the fluids of the body at their proper degree of dilution, it removes waste matters, distributes and regulates body heat.

5. *When a muscle is in a state of activity:* (1) It becomes shorter and thicker, but (2) there is no change in volume; (3) there is an increased consumption of oxygen; (4) more carbon dioxide is set free; (5) sarcolactic acid is produced; and hence (6) the muscle becomes acid in reaction; (7) it becomes more extensible, and (8) less elastic; (9) there is an increase in heat production and consequently a rise of temperature; (10) the electrical reaction becomes relatively negative; and (11) a sound is produced.

6. *Bile* is secreted by the liver. *The functions of the bile* are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach and thus inhibits peptic digestion; (7) it has very feeble antiseptic action.

7. *Parts of the small intestine:* Duodenum, jejunum,

ileum. *Parts of the large intestine:* Cecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid flexure, rectum.

NEUROLOGY.

1. *Acute ascending paralysis* is an ascending paralysis beginning in the legs, rapidly involving the trunk, diaphragm, arms, and the muscles innervated by the bulb (particularly the muscles of respiration), and so causes death. Its etiology is not settled; it is probably an acute infection of the spinal cord (sometimes including peripheral nerves and the bulb).

2. The *heart is controlled* by: Sympathetic nerves, which accelerate it; by the pneumogastrics, which have an inhibitory influence; probably by a depressor nerve; also by certain intrinsic cardiac ganglia.

3. "The speech areas, four in number and in kind, are in the left hemisphere in righthanded persons and in the right in lefthanded persons. * * * * The motor speech center lies in the posterior part of the third frontal convolution (Broca's convolution), just in front of the center of the muscles of speech (hypoglossal and facial nerve centers). * * * * The power of writing is usually lost with motor speech. The probable location of its cortical center is in the posterior two-thirds of the first, and perhaps in the second, temporal convolution. * * * * The visual speech center lies in the posterior part of the angular gyrus in the outskirts of the higher visual or the visuopsychic field."—(From Woolsey's *Applied Surgical Anatomy.*)

PHYSICAL DIAGNOSIS.

1. *Herpes zoster* is "an acute inflammatory disease, characterized by the development of groups of firm and distended vesicles situated upon inflamed bases corresponding to a definite cutaneous nerve, and accompanied by more or less severe neuralgic pains. The affection begins with neuralgic pains, either of a burning or lightning-like character, with slight febrile phenomena, followed by the appearance of papulovesicles along the tract of pain; these soon become vesicles situated on bright red, highly inflamed bases. The vesicles are about the size of pin-heads, or, perhaps, a little larger; usually discrete, although they frequently coalesce, forming irregular patches, appearing in groups until the third to the fifth or even tenth day, when they gradually desiccate, and at the end of the second week nothing remains except occasionally a

slight scar, which may disappear or become permanent. When the eruption is at its height it is perfect in its anatomic formation, each vesicle being well shaped and seated on a bright red, inflamed patch of skin, and distended with a translucent, yellowish fluid. The vesicles show no tendency to rupture spontaneously. In rare instances they may become purulent, hemorrhagic, or gangrenous. The eruption is almost invariably confined to one side of the body, although in rare instances it is seen upon both sides. It is usually found upon well-known nerve-tracts. Recurrence is rare."—(Hughes' *Practice of Medicine.*)

2. *Acute bronchitis* begins with coryza; soreness and tenderness may be behind the sternum; pain may be caused by coughing; expectoration is abundant; dyspnea is in proportion to the extent of the disease; the pulse-respiration ratio is not altered; fever is slight or absent; various rales may be present; the condition is generally bilateral; ends by lysis.

Lobar pneumonia begins with rigors, sometimes also with vomiting; pain on affected side; expectoration is rusty and tenacious; breathing is very rapid; the pulse-respiration ratio is much disturbed; there is considerable fever; crepitant râles are heard in first stage, also in third stage (râle redux); usually only one side is affected; ends by crisis.

3. *High blood pressure* can be determined by the use of a sphygmomanometer; it is found in: Arteriosclerosis, chronic interstitial nephritis, cerebral hemorrhage, uremia, gout, aortic regurgitation, angina pectoris, puerperal eclampsia.

4. *Physical signs of aortic regurgitation: "Inspection* shows that the cardiac impulse is forcible and displaced downward and to the left. The pulsation is visible far beyond the normal apex. *Palpation* confirms inspection. It may at times serve to detect a diastolic thrill over the base of the heart and the adjacent large vessels. The Corrigan pulse and the capillary pulse are recognized by palpation. *Percussion* serves to demonstrate an increase in the area of cardiac dullness downward and to the left. Occasionally it is increased upward and to the left of the sternum as the result of hypertrophy of the left auricle. *Auscultation* reveals characteristic alterations in the heart sounds. The first sound is forcible; the second sound is replaced or associated with a churning, rushing, or blowing murmur of low pitch, well heard at the second right costal cartilage (aortic area), but most distinct at the junction of the sternum and the fourth left costal car-

tilage. It is diastolic in time, and is transmitted downward and toward the apex. A presystolic rumbling murmur (Flint murmur) may occasionally be heard over a limited area at the apex."—Hughes' *Practice of Medicine.*)

5. *Organic murmurs* are due to stenosis or incompetency of one or more of the valves of the heart.

Functional murmurs are not due to valvular disease.

Organic murmurs may be systolic or diastolic; may be accompanied by marked dilatation or hypertrophy, and there will probably be a history of rheumatism or of some other disease capable of producing endocarditis. Whereas a murmur, usually systolic, soft, and blowing, heard best over the pulmonic area, associated with evidences of chlorosis or anemia, and affected by the position of the patient, is a *hemic* or *functional* murmur, and denotes as a rule an impoverished condition of the blood.

OPHTHALMOLOGY AND OTOLOGY.

1. *Trachoma* is an inflammatory condition of the conjunctiva, accompanied by hypertrophy, granule formation, and subsequent cicatricial changes.

In *conjunctivitis* there are no granules with subsequent cicatricial changes.

2. *For chemical burns of the eyeball:* The treatment consists in the complete removal of the caustic substance as soon as possible. Solid particles are removed with cotton or forceps. Then the conjunctival sac is washed out with solutions which tend to neutralize the corrosive substance or render it insoluble. In the case of lime, mortar, or caustic alkalies, we flush out with a solution of boric acid; or we may wash out the eye with oil. If the corrosive agent consisted of an acid, the eye is irrigated with a weak solution of sodium bicarbonate. Subsequently we use cold compresses, atropine, and sometimes a bandage. After the loosening of the eschars, we must separate the adhesions frequently. Symblepharon often occurs notwithstanding the greatest care.—(May's *Diseases of the Eye.*)

3. MASTOIDITIS. "Inflammation of the mastoid cells may be produced by the extension of the disease from the tympanum. Rarely it is due to extension of external inflammation. The symptoms are deep-seated pain (increasing on deep pressure), swelling and tenderness over the mastoid process, accompanied by more or less fever and rapid pulse, coated tongue, anorexia, and malaise. When the periosteum is affected the

tissues behind the ear are swollen and the auricle stands out from the head, the canal is smaller and the posterior superior, inner bony wall of the canal droops. If pus has formed, fluctuation may be detected."—(*Cyclopedia of Medicine and Surgery.*) Other causes are: Long exposure to wet or cold, and some of the acute exanthematous diseases. *Possible serious results* are: Thrombus formation in the sigmoid or other sinus, abscess formation in the brain, meningitis, septicemia, pyemia.

PEDIATRICS.

1. *Scarlet fever.* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent.

Measles. Period of incubation, ten to twelve days. Stage of invasion, four days. Character of eruption, small dark red papules with crescentic borders, beginning on face and rapidly spreading over entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present.

2. *Summer diarrhea,* or cholera infantum, is due to the toxins produced by bacteria in milk. Treatment: Ordinary diarrhea snould be prevented from terminating in cholera infantum. The stomach and colon should be irrigated. From ʒ2-4 of water at 100° F. should be allowed to flow into the stomach through a soft-rubber catheter and be siphoned out. This should be done only once. For the colon, sodium bicarbonate, ʒ1, should be added to the pint, and the irrigation performed twice daily. If the rectal temperature is very high ice-cold water should be used; otherwise warm water. When symptoms of collapse appear hot pack is used. Ice-water quenches the thirst, even if it is vomited. Champagne and drop-doses of brandy may be given if the stomach is tolerant. Strychnine, gr. 1/100 hypodermically, to a child one year old, is a valuable stimulant. Morphine, gr. 1/100, and atropine, gr. 1/800, may be given in the same way and repeated every hour until the child is quieted—(*Pocket Cyclopedia.*)

ILLINOIS.

PRACTICE.

1. LOBAR PNEUMONIA. *Diagnosis:* (1) From *acute phthisis:* The symptoms and physical signs of *lobar pneumonia* and *acute pneumonic phthisis* may be the same for the first eight or ten days; at this period the fever in *pneumonia* drops by crisis; whereas in *phthisis* the fever continues for some time longer and the patient gets worse; the sputum contains tubercle bacilli and elastic fibers, and instead of retaining the rusty color it becomes purulent and greenish.

In *pneumonia*, the breathing is very rapid, the pulse-respiration rate is disturbed, the fever is usually high, and runs a regular course, crepitant râles are heard at first, then signs of consolidation follow, and crepitant râles again succeed.

In *phthisis*, the breathing is hurried and there is dyspnea, the fever is often high, but does not run a regular course, at first the signs are those of bronchitis, followed by consolidation, a softening, or excavation in different parts of the lungs; sometimes there is nothing to be heard but scattered râles.

(2) From *bronchopneumonia:*

LOBAR PNEUMONIA	BRONCHOPNEUMONIA
Generally a primary disease.	Generally secondary (to bronchitis or an infectious disease).
Age has little influence.	Generally found in very young or very old.
Sudden onset.	Gradual onset.
Fever is high and regular.	Fever is not so high, and is irregular.
Ends by crisis between sixth and tenth day.	Ends by lysis, at no particular date.
Generally only one lung affected.	Generally both lungs affected.
The physical signs are distinct, and there is a large area of consolidation.	Physical signs indistinct, and the evidences of consolidation are indefinite.
Sputum is rusty.	Sputum is rather streaked with blood.

(3) From *acute bronchitis*, see PHYSICAL DIAGNOSIS, question 2.

Treatment: "Consists in rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by apply-

ing ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet-pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease."—(*Pocket Cyclopedia.*)

2. The *chancre* requires local cleanliness. Some preparation of mercury must be given for a long period of time, either by mouth, by inunction, or by hypodermic injection. Salvarsan given either subcutaneously, intravenously, or intramuscularly is the most modern form of treatment.

HYPERTROPHIC CIRRHOSIS.	ATROPHIC CIRRHOSIS.
Jaundice. Early and marked, bile often absent from feces.	Late and slight, bile usually present.
Ascites. Late and unimportant.	May be early; often enormous.
Spleen. Enlarged early and markedly.	Late and less.
Alimentary hemorrhage, piles. Not common.	Common.
Liver. Large, smooth, mottled, green.	Small, rough, pale or yellow.
New fibrous tissue. In fine lines and strands between acini and cells, involving all parts equally.	In broad bands, making prominent islands in which the single acinus may appear nearly normal; distributed irregularly.

3. DIAGNOSIS OF CIRRHOSIS OF THE LIVER. "The characteristics of hepatic cirrhosis are the history, area of liver dullness, symptoms of portal obstruction, jaundice, and the course and termination. The distinction between the two varieties is well given by Thayer in the preceding table:

Atrophy of the liver, or the nutmeg liver, is almost always confounded with cirrhosis; the former occurs most commonly with obstructive diseases of the heart

and lungs, and the surface of the organ is not nodulated, nor is there a history of alcoholism.

Cancer and tubercle of the peritoneum have many symptoms akin to cirrhosis. The points of differentiation are great tenderness over abdomen, rapidly-developed ascites, rapid decline in strength and flesh, absence of jaundice, absence of long-continued dyspepsia, absence of hepatic changes on percussion, and the presence of tubercle or cancer deposits in other organs."—(Hughes' *Practice of Medicine.*)

4. *Treatment of la grippe:* "Absolute rest in bed and liquid diet should be prescribed. The administration of fractional doses of calomel (gr. 1/6 every hour for 6 doses) should begin the treatment. Phenacetin, gr. 5 every 3 or 4 hours, may be given for the fever and the pains. Quinine (gr. 4), sodium salicylate (gr. 7), or whiskey (ℨ4) may be administered every 3 or 4 hours. The local application of menthol (gr. 1½) in liquid vaselin (ℨ1) to the nasal mucous membrane is beneficial. Sulphonal (gr. 10) or trional (gr. 15) will relieve insomnia. Iron, quinine, and strychnine are indicated in the convalescence."—(*Pocket Cyclopedia.*)

5. *Treatment of tapeworm:* The patient should be limited to a liquid diet for two days; salines should then be administered; then the oleoresin of aspidium in a dose of one to two drams, followed in a few hours by another saline. The treatment can only be considered successful when the head of the worm is found in the dejecta.

6. Headache "may be due to organic cerebral disease, congestion and anemia of the brain, functional nervous disorders, toxemic conditions, derangements of the stomach and liver, and reflex causes, such as eye-strain, nasal disease, etc. The *treatment* should be directed to the cause. Eye-strain should be sought for and corrected, as well as any existing nasal disease. Toxemic states should be remedied by dietary and medicinal prescriptions. Anemia calls for preparations of iron. Uterine disease should be corrected. Cerebral syphilis demands mercurials and iodides. Preparations containing citrated caffeine, monobromated camphor, acetanilid, phenacetin, etc., may be given during the attack. For nervous headaches, a pill containing zinc phosphide (gr. 1/10) and extract of nux vomica (gr. 1/3) may be administered. Palliative treatment consists in local applications of cold, evaporating lotions, menthol, thymol. Various pungent and aromatic spirits are useful for inhalation."—(*Pocket Cyclopedia.*)

7. *Treatment of constipation:* The cultivation of a regular habit is essential; fruit, vegetables, and substances which leave a residue should form part of the diet; castor oil, or cascara, or calomel or a saline or an injection of water or oil may be tried, but drugs should be dispensed with as long as possible; exercise or massage may be beneficial; fats or olive oil may be taken; the pill of aloin, belladonna and strychnine may be tried.

8. LOCOMOTOR ATAXIA. *Etiology:* It is a disease of adult life; is more common in men than in women; is more common in cities than in the country; syphilis is believed to be the most frequent direct cause; alcoholism, injury, exposure to cold and wet, have all been urged as causes, but they are not now assigned so important a place as etiological factors as was formerly the case.

Symptom: Loss of coordination; characteristic and unsteady gait; tendency to stagger when standing up with feet together and eyes closed; sharp and paroxysmal pain, called *crises;* girdle sensation; loss of knee-jerk and other reflexes; Argyll-Robertson pupil.

Prognosis is unfavorable; the disease is chronic, but may remit for a period; death by some intercurrent affection may occur.

Treatment consists of rest in bed for long periods, absence of excitement, nutritious food, cod liver oil, tonics, silver nitrate, massage, systematic exercises, counterirritation, and analgesics.

9. In *endocarditis:* The murmur is soft, not harsh; it is systolic or diastolic; it may be transmitted; it is heard loudest at definite points; it is not followed by signs of effusion; the apex beat may be strong.

In *pericarditis:* The murmur is harsh; is not in connection with the heart sounds; is heard loudest at the base of the heart and over the precordium; is followed by (or accompanied with) signs of effusion; the apex beat is generally feeble.

Some of the causes of endocarditis are: Acute articular rheumatism, chorea, tonsillitis, scarlet fever, pneumonia, cancer, gout, diabetes mellitus, Bright's disease, septicemia, gonorrhea.

Treatment of endocarditis: "All forms of endocarditis require absolute rest, which should be prolonged for weeks or even months. The primary disease should be treated. Overstimulation of the heart must be avoided, and it is in acute endocarditis that most harm is likely to be done by the indiscriminate use of digitalis, though it may be called for if the heart is fail-

ing. Rest, light diet, milk while fever is present, attention to the bowels and to sleep, form the best treatment of simple endocarditis. The malignant form should be treated like septicemia. If the organism can be isolated from the blood, antistreptococcic serum or a vaccine may be tried, but under any treatment most cases have a fatal ending."—(Wheeler and Jack's *Handbook of Medicine.*)

10. CHRONIC RHEUMATISM. *Cause:* "The disease is most common among the middle-aged poor, particularly those who are exposed to cold and wet. Very rarely it follows acute rheumatism." *Treatment.*—"Internal medication is unsatisfactory. Guaiacum, iodide of potassium, and arsenic are recommended, but the salicylates are ineffectual. Local measures, such as counterirritation, massage, passive movement, and hydrotherapy are much more useful. Obstinately painful nodules may be excised. A course of baths, and a warm winter climate may be of great service in cases where such measures are possible."—(Wheeler and Jack's *Handbook of Medicine.*)

SURGERY.

1. *Surgical diseases of the third nerve:* "One or more of the branches of this nerve may be compressed by extravasated blood, or be contused and lacerated in fractures implicating the region of the sphenoidal fissure. Tumors and aneurysms growing in this region also may press upon the nerve. Sometimes both nerves are involved; for example, in fractures involving both sides of the anterior fossa, and in tumors, particularly gummata, growing in the region of the floor of the third ventricle. In lesions of the cerebral hemispheres the third nerve is very frequently paralyzed. Its cortical center lies in close proximity to the center for the face. The most prominent symptoms of complete paralysis are ptosis or drooping of the upper eyelid, external strabismus, and slight downward rotation of the eye. There is also dilatation of the pupil from paralysis of the circular fibers of the iris, and loss of accommodation from paralysis of the ciliary muscle. Paralysis of the muscles supplied by the third nerve is frequently associated with paralysis of other ocular muscles. When all the muscles of the eye are paralyzed, the condition is known as "ophthalmoplegia externa"; it is usually due to syphilitic disease in the floor of the third ventricle."—(Thomson and Miles' *Manual of Surgery.*)

2. *Tendon transplantation:* "This operation consists

in altering the attachments of the tendons of healthy muscles so as to have them fulfil the functions of those which are paralyzed. Four methods of transplantation are practised: first, the tendon of the healthy muscle may be completely divided and the upper end sutured to the paralyzed tendon; second, the tendon of the paralyzed muscle may be divided and the lower end sutured to the healthy one; third, the tendon of the sound muscle may be split, one end remaining attached to its normal insertion, and the other sutured to the paralyzed tendon; fourth, a portion or the whole of the healthy tendon may be implanted subperiosteally at the desired point, instead of stitching it to the paralyzed tendon."—(Wharton's *Minor Surgery.*)

8. The structure in which *rodent ulcer* most commonly develops is the sebaceous glands of the skin. Surgical treatment consists of free removal with a good margin all around the ulcer; if this is not practicable the Roentgen rays may be tried.

4. *Delayed union in fracture is caused by:* Ill health, want of approximation of the end of the bone, want of blood supply in the bone, defective innervation of the bone, disease of the bone, lack of rest, and immobility.

5. To accomplish *male sterilization* a partial vasectomy may be performed. The skin and fascia are incised, the spermatic cord is exposed just below the external abdominal ring, the vas is separated, and two ligatures are placed around it about ¾ inch apart; half an inch of this part is excised, and the wound is closed with ligatures.

6. *Bloodless operation for amputation at the hip:* "The most satisfactory method in the great majority of cases is Wyeth's, in which a constrictor is held in place by the preliminary passage of two steel pins. The outer pin is inserted an inch and a half below and a little internal to the anterior superior spine of the ilium, and is brought out just back of the great trochanter. The inner pin is entered one inch below the level of the crotch and internal to the saphenous opening, and it emerges an inch and a half in front of the tuberosity of the ischium. A sterile cork is pushed on the end of each pin, to save the surgeon from wounding himself from the sharp points. After the limb has been emptied of blood by holding it in a vertical position for five minutes and stroking it from the periphery toward the body, the constricting band is fastened about the limb above the pins. After the passage of the pins and the application of the band of the Esmarch apparatus, the amputation is proceeded with.

The hip is brought well over the edge of the table, a circular incision is made down to the deep fascia, six inches below the constricting band, and is joined by a longitudinal skin-cut reaching from the band to the level of the circular incision, and the cuff is reflected to the level of the lesser trochanter. The muscles are cut by a circular sweep at the level of the retracted cuff, the capsule of the hip-joint is opened freely, the cotyloid ligament is cut posteriorly, the thigh is bent upward, forward, and inward to dislocate the head of the bone, and, using the thigh as a handle, the round ligament is incised and the limb removed. After ligating the vessels and introducing drainage tubes the flaps are sewn together vertically."—(Da Costa's *Modern Surgery.*)

7. TENOSYNOVITIS. *Etiology:* Strain, sprain, overuse, wounds, infection, tuberculosis, inflammation. *Treatment:* Rest, hot fomentations, massage, counter-irritation, rupture by pressure, incision, excision.

8. (1) *Talipes varus,* in which the inner edge of the foot is drawn up, the anterior two-thirds is twisted inward, and the outer edge rests on the ground.

(2) *Talipes valgus;* in which the outer edge of the foot is drawn upward, and the inner side of the foot and ankle rest on the ground. This condition is the reverse of *talipes varus.*

(3) *Talipes equinus,* in which the heel is raised and cannot be brought to the ground, and the patient walks on the toes and on the distal ends of the metatarsal bones.

(4) *Talipes calcaneus,* in which the toes are raised and the heel depressed, so that the patient walks on the latter. This condition is the reverse of *talipes equinus.*

(5) *Talipes equinovarus,* in which the heel cannot be brought to the ground, and the patient walks on the outer margin of the sole.

9. In *wrist-amputation* the following *blood vessels and nerves are severed:* Radial, ulnar, superficial volar, dorsalis indicis, and radialis indicis arteries; and median, radial, and ulnar nerves.

10. A *wound may be closed* when there is no severe hemorrhage, no foreign bodies present, and when the wound is not infected.

OBSTETRICS.

1 and 2. FEMALE ORGANS OF GENERATION: *Uterus.* The rectum lies behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis

at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx.

The *Fallopian tubes* are about 4½ inches long, situated in the broad ligament, and extending from the upper corner of the fundus of the uterus outward to the pelvic wall. Their caliber is larger at the outer fimbriated end than at the inner end.

The *ovaries* are almond-shaped bodies situated below the outer end of the Fallopian tube, and between the layers of the broad ligaments.

The *vagina* is a muscular tube extending from the uterus to the external surface. The anterior and posterior surfaces are in apposition. The anterior wall is about 3½ inches long, the posterior about 4½ inches.

Function of ovaries: To develop ova, and an internal secretion.

3. LIQUOR AMNII. *Functions:* (*a*) *During pregnancy:* (1) As a protection to the fetus against pressure and shocks from without. (2) As a protection to the uterus from excessive fetal movements. (3) It distends the uterus and thus allows for the growth and movements of the fetus. (4) It receives the excretions of the fetus. (5) It surrounds the fetus with a medium of equable temperature, and serves to prevent loss of heat. (6) It prevents the formation of adhesions between the fetus and the walls of the amniotic sac. (7) It has been supposed, by some, to afford some slight nutrition to the fetus. (*b*) *During labor:* It acts as a fluid wedge, and dilates the os uteri and the cervix; it also slightly lubricates the parts.

Composition: Chiefly water, but it contains also small amounts of albumin, epithelial cells, urea, phosphates, chlorides, etc.

4. Hydatidiform mole is derived from the chorionic villi.

5. *Anomalies of placenta:* Low insertion, placenta prævia, hypertrophy, abnormally thick, abnormally small, horseshoe or crescentic shaped, lobed; degeneration, edema, infarction, calcification, or disease of the placenta.

6. *Umbilical hernia.*—"There are two varieties of this deformity. In one, a knuckle of intestine covered by skin projects from the navel. This degree of deformity is common, occurring in two per cent. of infants. It is treated by a convex button, cork, or hard rubber compress on a strip of adhesive plaster, which encircles two-thirds of the child's body. This improvised truss is renewed from time to time, and should

be worn six months. In the second variety there is an exomphalic condition, due to defective development, the intestines protruding from the umbilicus covered only by amnion. An immediate plastic operation is indicated even if the mass of protruding intestines is as large as an apple. The results of this operation have been excellent."—(Hirst's *Obstetrics.*)

7. *The objective signs of pregnancy at the fifth month* are: Hearing the fetal heart sounds, ballottement, uterine souffle, and the breast signs.

8. *Treatment of edema of the vulva during pregnancy:* "If the cause can be removed, the edema disappears. The treatment of kidney insufficiency removes the dropsy of the labia associated with that condition, as it does the other dropsies of the body. If the edema is due to pressure, rest in bed, with the occasional assumption of the knee-chest posture, often gives relief. If the edema does not yield to general treatment and to hot fomentations locally, the labia may be punctured. It should be remembered, however, that even this slight operation may terminate pregnancy. The vitality of the part, moreover, is so lowered that infection and even gangrene may follow the puncture." —(Hirst's *Obstetrics.*)

9. *Presentations and position:* Vertex presentations are most frequent; of these L.O.A., R.O.P., R.O.A., and L.O.P. are the positions in order of frequency. Breech presentations are second in order of frequency; of these the L.S.A., R.S.P., and then R.S.A. and L.S.P. indicate the order of frequency. Face and shoulder presentations are next; of the face, the order is: R.M.P., L.M.A., R.M.P., and L.M.P.; of the shoulder, L.D.A. is the most common. Brow presentation is the most rare.

10. MASTITIS. *Etiology:* Infection, generally due to handling; cracked or sore nipples and overactivity of the gland with retained secretion are predisposing causes. *Treatment:* This consists in resting the part; supporting it, applying a hot boracic acid fomentation; nursing from the affected breast should be stopped at once.

Prophylactic measures consist in not touching the breasts (by doctor or nurse or patient) without thoroughly clean hands; by washing and drying the nipple hygienic conditions before labor, and the nipple and before and after nursing, and by proper attention to breasts being preserved from pressure.

GYNECOLOGY.

1. *Metrorrhagia* is a hemorrhage from the uterus at other than the menstrual periods.

Local causes: Uterine displacements, malignant disease, inflammation of uterus or appendages, fibroids, cystic degeneration of the cervix, subinvolution, ectopic gestation, abdominal tumors.

General causes: Hemophilia, scurvy, purpura, malaria, anemia, mitral disease, diseases of kidneys, or liver, acute infectious fevers.

2. In *appendicitis* the pain is of sudden onset and is localized in the right iliac fossa; there is abdominal rigidity, chiefly of the right rectus muscle, and tenderness at McBurney's point; there are usually fever, nausea, vomiting, and constipation.

In *inflammation of the right ovary* the pain is not localized, but may be bilateral, and spreads to the vagina and rectum; there is no tenderness at McBurney's point; it is usually worse just before the menstrual period, which sometimes affords relief; on vaginal examination the ovary is found to be tender.

3. "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility; nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy; pains are often very severe, with marked tenderness within the pelvis; such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating; this tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The os uteri is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*"—(*American Textbook of Obstetrics.*)

Treatment consists in removal of the product of conception, by a laparotomy, as soon as the diagnosis is made.

4. INCONTINENCE OF URINE, IN WOMEN. *Causes:* "This condition may be found in hysteria; in various injuries or diseases of the brain and spinal cord where the sphincter power of the neck of the bladder and

urethra is lost, *e.g.* in certain stages of locomotor ataxia, epilepsy; in advanced tuberculosis impairing the sphincter action; in vesicovaginal fistula; dilatation of the urethra; intoxication; in various forms of stupor, *e.g.* typhoid state; it may be due to strong stimuli acting on the bladder, urethra, or neighboring parts, *e.g.* applications to neck of bladder or inner end of urethra; acute cystitis, calculus, sudden submucous hemorrhages, caruncle, fissures, inflammation in tubes, ovaries, uterus, rectum; it may be found in early pregnancy. In childhood there may be a true incontinence due to sphincter paralysis, hyperesthesia of the vesical mucosa, some localized trouble, or a nervous condition; but in the majority of cases the irritation is reflex, from such conditions as oxaluria, lithemia, worms in the bowel or vagina, polypi of rectum, eczema of vulva or perineum, etc., and is in most cases only found at night. Once the habit is formed, it may remain long after the cause is removed."—(Webster's *Diseases of Women.*) *Treatment:* Remove the cause; attend to general health; medication is of but little value; an operation may be necessary.

5. CAUSES OF DOWNWARD DISPLACEMENTS OF THE UTERUS: (1) *Pressure from above* (pelvic or abdominal tumors, ascites, tight or heavy clothing, straining at stool, muscular exertion, fecal accumulations, habitual overdistention of the bladder); (2) *weakening and relaxation of the uterine supports* (subinvolution, senile atrophy of pelvic floor, abnormally large pelvis, increased weight of uterus, puerperal traumatisms, pressure from above, traction from below); (3) *increased weight of uterus* (congestion, subinvolution, metritis, pregnancy, fluid in the endometrium, uterine tumors); (4) *traction from below* (vaginal cicatrices, falling and pelvic floor, contraction and congenital shortening of vagina, tumors of cervix or vagina.)—(From Dudley's *Gynecology.*)

6. *Symptoms of fibroids:* Hemorrhage, leucorrhea, pain, pressure symptoms (disturbances and displacements of bladder, rectum, urethra, and uterus), backache, bearing-down sensation, dysmenorrhea.

The *differential diagnosis* is as follows:

"(1) *Parauterine cellulitic deposits* show a history of a febrile condition, a sudden onset, and the fixation and sensitiveness of the uterus.

"(2) *Hematocele* shows itself in a sudden appearance, the tumor being immovable and sensitive. The tumor is at first semifluid; later it may be tympanitic.

"(3) *Ovarian tumors.*—Vaginal touch and the use

of the sound will show that the tumor is not attached to the uterus. Percussion of the abdomen will give fluctuation. There is generally more deterioration of health. Solid ovarian tumors adherent to the uterus are almost impossible to differentiate.

"(4) *Pregnancy.*—There is amenorrhea. The tumor is symmetric, softer, and of more regular growth. In doubtful cases the development of fetal heart-sounds and movements will settle the diagnosis.

"(5) *Tubal diseases* can be excluded by the shape of the tumor, the great tenderness, and lessened mobility of the uterus.

"(6) The area of displacement of a *floating kidney* will appear above the pelvic brim, while that of a fibroid is below the inlet."—(Wells' *Compend of Gynecology.*)

LARYNGOLOGY AND RHINOLOGY.

1. ABSCESS OF ANTRUM OF HIGHMORE. *Symptoms:* "There is pain, tenderness on pressing over the canine fossa or on tapping the teeth of the upper jaw, and sometimes swelling of the cheek. The complaint of a bad odor or taste, the reappearance of pus in the middle meatus after mopping it away and directing the patient to bend his head well forward, and opacity on transillumination of the suspected cavity are signs which strongly suggest an affection of the maxillary sinus. The withdrawal of pus by a puncture through the thin outer wall of the inferior meatus of the nose with a fine trocar and canula will establish the diagnosis. The *treatment* consists in opening and draining the antrum. If the infection is due to a carious tooth this should be extracted, the socket opened up and drainage established through it. If the teeth are sound the antrum is opened through the canine fossa and its walls curetted, after which the cavity is packed with iodoform worsted. To avoid the risk of reinfecting the cavity from the mouth, an opening may be made into the nose, by removing the anterior portion of the nasal wall of the antrum and part of the inferior turbinated bone, after which the incision in the buccal mucous membrane is closed with sutures."—(Thomson and Miles' *Surgery.*)

2. "Laryngotomy is rarely undertaken except for the relief of dyspnea arising from some sudden obstruction to the respiration, and is thus to be looked on as an operation of urgency. It is required in cases where the entrance to the larynx is obstructed by a foreign body, for spasm of the glottis, or for accumulations of blood in the neighborhood of the larynx during an

operation. It is readily performed by making a vertical incision over the situation of the cricothyroid membrane, which is then divided transversely along the upper border of the cricoid cartilage, the sternohyoid muscles being, if necessary, drawn aside, and a tube inserted. Possibly the small cricothyroid artery arising from the superior thyroid may require a ligature. In cases of great urgency, a simple transverse incision may be made with a penknife, and the larynx opened, the margins of the wound being held aside by a hairpin, or by the handle of a scalpel turned edgeways, while a toothpick will serve temporarily as a cannula. Whenever there is time to operate deliberately, a high tracheotomy is the better practice, since a tube inserted through the cricothyroid space gives rise to considerable irritation, and the voice may be subsequently impaired by the contraction of the cicatrix. A special laryngotomy tube is required, the lumen of which is not circular, but oval and flattened from above downward."—(Rose and Carless' *Surgery*.)

MEDICAL JURISPRUDENCE.

1. If respiration has taken place, its lungs will float on being put into water. Further, the lungs before respiration are situated at the back of the thorax and do not fill the cavity; whereas, after respiration they fill the whole cavity.

Application of hydrostatic test.—Having opened chest, note *position* of lungs (*before* respiration they occupy a small space at upper and posterior parts of thorax); their *volume* (of course increased after breathing); their *shape* (before respiration, borders sharp or pointed; after it, rounded); their *color* (before breathing, brownish-red; after it, pale red or pink); their appearance as regards disease and putrefaction; and whether they *crepitate* on pressure (as they will *after* respiration).

"Take out lungs, with heart attached, and place them in pure water having temperature of surrounding air. Note whether they float (high or low), or sink (slowly or rapidly). Separate them from the heart; weigh them accurately, and then place them in water again, and note sinking or floating as before. Subject each lung to pressure with the hand, and note sinking or floating again. Cut each lung in pieces and test floating again. Take out each piece, wrap it in a cloth, and compress with fingers as hard as possible, and test floating, etc., as before. The crucial test of *perfect respiration* is each piece floating after the most vigorous compression."—(King's *Manual of Obstetrics*.)

2. *Symptoms of acute poisoning by mercuric chloride:* The nauseous metallic taste is experienced during the act of swallowing. Within a few moments this is followed by an intense, burning pain in the mouth, throat, and stomach. The mouth and tongue are whitened and shriveled. There are vomitings of a white material, containing shreds of mucous membrane, and tinged with blood, and bloody stools. Salivation occurs if life be sufficiently prolonged."—(Witthaus.)

Mercury may be detected in the urine or vomited material by the Reinisch test. To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Put the copper into a clean, dry glass tube, open at both ends, and apply heat where the copper is. If mercury is present it will be deposited in the cold part of the tube, forming a mirror.

STATE BOARD EXAMINATION QUESTIONS.

INDIANA STATE BOARD OF MEDICAL REGISTRATION AND EXAMINATION.

ANATOMY.

1. Give the relation of the internal abdominal ring to surrounding blood-vessels.
2. Give the origin, principal branches, and distribution of the superior mesenteric artery.
3. Give the boundaries and contents of the axillary space.
4. What part of the brain is most freely supplied with blood?
5. Describe the blood supply to the liver structure.
6. Describe the large intestine and tell how it differs from the small intestine in structural arrangement.
7. Give the names of the (*a*) temporary teeth in their order from front to back, (*b*) permanent teeth in same order.
8. What nerves unite to form the brachial plexus?
9. Name the most important nerve branch of the cervical plexus, its point of origin, and its distribution.
10. Give the names and locations of the bones of the face.

PHYSIOLOGY.

1. (*a*) What is meant by digestion? (*b*) Describe the process of digestion of an egg sandwich.
2. Discuss the factors concerned in venous circulation.

3. (*a*) Describe a cell. (*b*) How are cells propagated? (*c*) Give the functions of nerve cells.
4. (*a*) Describe the vasomotor system. (*b*) Give its function. (*c*) What center controls it?
5. (*a*) Compare voluntary and involuntary muscle. (*b*) What is muscular coordination? (*c*) By what centers is it controlled? (*d*) What causes muscular fatigue?
6. (*a*) Describe the respiratory function. (*b*) What is meant by the terms: (1) Residual air? (2) Vital capacity?
7. (*a*) Give the composition of the blood. (*b*) Reaction. (*c*) Specific gravity. (*d*) Amount in the body. (*e*) Time required for a complete circulation.

MATERIA MEDICA AND THERAPEUTICS.

1. Define solvent. Mention three principal solvents.
2. Define diaphoresis. Mention three diaphoretics and state the dose of each.
3. State the name and the dose of each of two cardiac stimulants.
4. In what form is iodine most frequently administered internally? What is the antidote for free iodine?
5. What serious results may ensue from the indiscriminate use of acetanilid?
6. Mention the conditions which affect the dosage of medicines.
7. What is cumulative action? Name one drug that has this tendency, and give symptoms of such action.
8. Name and describe three antiseptics useful for internal medication.
9. Name three indications for the use of opium.
10. How and when would you perform hypodermoclysis?

CHEMISTRY.

1. Give the formula for the two chief products of yeast fermentation of sugar and state the differences, if any, in the action of yeast upon cane sugar, milk sugar, and grape sugar.
2. State the chief differences between fixed and volatile oil and name three of each class that are extensively used in medicine.
3. Give the chemical composition and properties of ammonia gas.
4. Give the approximate constituents of cow's milk.
5. Give the chemical formula for urea and what is the normal amount excreted daily by an average adult.

PHYSICAL DIAGNOSIS.

1. Give physical signs of aneurysm of the thoracic aorta.

2. Give cardinal symptoms by which you can diagnose a case of appendicitis.

3. Give topographical anatomy of the heart and its valves.

4. (*a*) Give normal temperature of the body. (*b*) Give normal pulse (frequency).

5. If a man or woman, past middle age, complaining of constant slight vertigo, intensified on excitement or exertion, presents sclerosed arteries, arcus senilis, and ringing aortic closure, with or without moderate cardiac hypertrophy, what would be your diagnosis?

PATHOLOGY AND BACTERIOLOGY.

1. Define in contrast infection and intoxication.

2. What do you understand by phagocytosis, and what is its relation to immunization?

3. From what does thrombosis of the portal vein most frequently result?

4. From what does chronic gastritis most frequently result?

5. Name the pathological conditions most commonly found in the lymphatic glands.

6. How would you demonstrate the presence of the amœba coli in a case of amœbic dysentery?

7. How would you demonstrate the efficiency of a germicide?

8. Describe one method by which you can demonstrate the agglutination of bacteria by blood serum.

9. What bacteria most frequently cause puerperal infection?

10. Examine and name the pathogenic organisms under the microscopes No. 1, No. 2, No. 3.

ETIOLOGY AND HYGIENE.

1. Give the accredited causes of malaria and yellow fever and tell what measures afford the best means of protection from infection.

2. How are impurities in water classified; how can they be detected, and why is the presence of organic material in drinking water deleterious?

3. Illustrate the theory of immunity by means of antitoxin.

4. Is infantile paralysis infectious? If so, give rules for protecting the community.

5. Give etiology of: (*a*) hepatic abscess, (*b*) cardiac hypertrophy, (*c*) edema of the lungs.

PRACTICE.

1. Write in parallel columns the diagnostic symptoms of measles and smallpox.

2. Write in parallel columns the diagnostic symptoms of neuralgia and myalgia.
3. Mention the forms of insanity, and give the most common causes.
4. Give a differential diagnosis of pleurisy and pneumonia.
5. What are the average durations of the febrile stages in the following forms of disease: Typhoid fever, scarlet fever, measles, rheumatic fever, and pneumonia?
6. Give the symptoms of greatest diagnostic importance in locomotor ataxia.
7. Give the pathognomonic symptoms of hysteria.
8. Give symptoms and treatment of incipient phthisis.
9. What forms of disease present symptoms during the first three days resembling variola?
10. With what form of disease may scarlatina be confounded prior to the appearance of eruption?

OBSTETRICS.

1. Give the physiology of impregnation.
2. Describe the development of the fertilized ovum.
3. What is meconium, and what are its diagnostic relations?
4. Describe the human uterus and give its anatomical relations.
5. Describe the vitellus, allantois, and the amnion.
6. How soon after confinement should a woman menstruate?
7. State some of the causes of sterility.
8. What conditions have a bearing on the time of life in the female when menstruation first occurs?
9. Are maternal impressions transmitted to the child in utero to such an extent as to produce marks, defects, and abnormalities?
10. Describe Credé's method of prophylaxis for ophthalmia neonatorum.

GYNECOLOGY.

1. Differentiate cystocele from (*a*) an anterior vaginal hernia, (*b*) a tumor situated in the vaginal wall.
2. Define prolapsus of the uterus and give differential diagnosis and treatment.
3. Define: (*a*) menorrhagia, (*b*) amenorrhea, (*c*) dysmenorrhea.
4. Give differential diagnosis and treatment of gonorrheal vaginitis.
5. Give technique for complete abdominal hysterectomy.
6. How would you distinguish shock from secondary hemorrhage?

SURGERY.

1. Define odontoma. Give varieties and origin of each variety.
2. Give symptoms and signs of cervical rib and how does cervical rib give symptoms and signs?
3. What is meant by coxa vara? What causes it?
4. Name the chief forms of spina bifida.
5. What is meant by Charcot's disease of a joint? What are its chief diagnostic features other than the general signs of tabes?
6. In middle meningeal hemorrhage, what extracranial treatment do you know of and what is its value? What caution is to be exercised, and why?
7. Describe operation for epithelioma of lower lip.
8. Name a few of the most important diagnostic points in ulcer of the duodenum and explain. Give physiological reasons.
9. What are the contraindications to surgery in gallstone in the common duct, and why?
10. What is a ranula?

PEDIATRICS.

1. Give symptoms and modern treatment for poliomyelitis.
2. Give cause and proper treatment of acute dysentery.

OPHTHALMOLOGY AND OTOLOGY.

1. Give causes, diagnosis, and treatment of chronic glaucoma.
2. Give causes, symptoms, and treatment of phlyctenular keratitis.
3. Give the origin of the acoustic nerve and its distribution in the labyrinth.

MEDICAL JURISPRUDENCE.

1. State fully what are the legal obligations of a physician or surgeon to his patient and what is his liability for malpractice.
2. State your ideas as to the conduct of a physician on a witness stand, including the manner of giving his evidence and the nature of it; also state conditions under which you would voluntarily testify as an expert witness.

RHINOLOGY AND LARYNGOLOGY.

1. Name seven diagnostic points of chronic hyperplastic ethmoiditis.
2. Name four contraindications to surgical treatment of the tonsils.

NEUROLOGY.

1. Give the six most important symptoms of tabes dorsalis.

2. Give the most significant symptoms of paralysis agitans.

3. How is migraine distinguished from other forms of headache?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

INDIANA STATE BOARD OF MEDICAL REGISTRATION AND EXAMINATION.

ANATOMY.

1. *Relation of internal abdominal ring to surrounding blood-vessels:* The external iliac artery and vein lie immediately under the ring; the deep epigastric vessels are internal to the ring; and the deep circumflex iliac artery is external to the ring.

2. SUPERIOR MESENTERIC ARTERY. *Origin:* Abdominal aorta. *Branches:* Inferior pancreatico-duodenal, vasa intestini tenuis, Ileo-colic, Right colic, and Middle colic. *Distribution:* All the small intestine, except the first part of the duodenum; cecum; ascending and transverse colon.

3. The axilla is *bounded: Anteriorly,* by the clavicle, Subclavius, Pectoralis major, costocoracoid membrane, Pectoralis minor; *posteriorly,* by the Subscapularis, Teres major, and Latissimus dorsi; *internally,* by the first four ribs, first three Intercostal muscles, Serratus magnus; *externally,* by the humerus, Coracobrachialis, and Biceps.

Contents: Axillary vessels; brachial plexus of nerves and their branches; some branches of the intercostal nerves; lymphatic glands, fat, and loose areolar tissue.

4. The gray matter and the base of the brain are most freely supplied with blood.

5. The substance of the liver derives its blood-supply from the hepatic artery and its branches, also from the small hepatic branch of the gastric artery.

6. The large intestine extends from the termination of the ileum to the rectum. It differs from the small intestine in: (1) Its larger size; (2) its more fixed position; (3) the possession of teniæ; (4) in being sacculated; and (5) in possessing appendices epiploicæ.

The colon is divided into ascending, transverse descending, iliac, and pelvic. The *ascending colon* extends from the cecum to the under surface of the liver to the right of the gall-bladder, where it turns to the left, forming the *hepatic flexure.* It lies in the right iliac and right hypochondriac regions. The peritoneum covers the anterior and lateral surfaces. Length, 8 inches. The *transverse colon* passes from right to left, from the gall-bladder to the

spleen. It forms an arch, convex anteriorly and below: the *transverse arch of the colon.* It is entirely surrounded by peritoneum, which is attached posteriorly to the spine, forming the mesocolon. Length, 20 inches. The *descending colon* passes from the end of the transverse colon by a bend, *the splenic flexure.* Between the splenic flexure and the diaphragm, opposite the tenth left rib, is a fold of the peritoneum, the *costocolic ligament,* which slings up the spleen. The gut then passes downward to the iliac crest, ending in the iliac colon. The peritoneum invests its anterior and lateral surfaces. Length, 4 to 6 inches. The *iliac* colon is continuous with the descending colon at the left iliac, crest, and ends at the inner border of the left psoas. Peritoneum invests its anterior and lateral surfaces; it has no mesentery. Length, 5 to 6 inches. The *pelvic colon* extends from the inner border of the psoas to the level of the third sacral vertebra. Length, 16 or 17 inches; very variable. It has an extensive mesentery.—(From *Aids to Anatomy.*)

7. The *temporary* teeth, from front to back, are: Central incisor, lateral incisor, canine, first molar, and second molar.

The *permanent* teeth, from front to back, are: Central incisor, lateral incisor, canine, first bicuspid, second bicuspid, first molar, second molar, and third molar.

8. The brachial plexus is formed by the union of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves.

9. The most important nerve branch of the cervical plexus is, probably, the phrenic nerve. It arises chiefly from the fourth cervical nerve, with filaments from the third and fifth cervical nerves. It is distributed to the diaphragm, pericardium, and pleura.

10. THE BONES OF THE FACE. Two *nasal,* forming the bridge of the nose. Two *superior maxillary,* forming upper jaw; part of roof of mouth, nasal fossæ and orbital cavities. Two *lachrymal,* situated at the front and inner part of the orbit. Two *malar,* at upper and outer part of face, forming the cheek bone Two *palate,* at back part of nasal fossæ; they assist in formation of roof of mouth, and floor of orbit. Two *inferior turbinated,* on outer wall of nasal fossæ. *Vomer,* forming septum of nose. *Inferior maxillary,* or lower jaw.

PHYSIOLOGY.

1. *Digestion* is the name given to the series of changes occurring in food from the time of its ingestion till it is ready for absorption.

An egg sandwich consists of bread (proteid, carbohydrates and fat), butter (fat), and egg (proteid and fat).

The proteid is digested in the stomach and small intestine, where the pepsin (of the gastric juice) and trypsin (the pancreatic juice), respectively, turn it into proteoses and peptones. The carbohydrates are digested in the mouth, and small intestine, where the ptyalin (of the saliva) and amylopsin (of the pancreatic juice), respectively, turn it into maltose and dextrose. The fat is digested in the small intestine, where it is saponified by the steapsin (of the pancreatic juice) and the bile.

2. The factors concerned in venous circulation are: (1) The force exerted by the heart; (2) the suction action of the chest during inspiration; (3) the voluntary muscles; (4) the valves in the veins.

3. A *cell* is a mass of protoplasm, with a nucleus, and sometimes a nucleolus, centrosome, attraction cell and cell-membrane. It is capable of movement, response to stimuli, ingestion, egestion, assimilation, and reproduction. Cells multiply by simple division, but the division of the protoplasm is preceded by division of the nucleus. This latter occurs in two ways: (1) By direct, or simple, or amitotic division; and (2) by karyokinesis or indirect division, the more common way.

The *functions of nerve cells* are: (1) Receiving nerve impulses; (2) sending out nerve impulses; (3) modification of nerve impulses; and (4) nutrition of itself and its dendrites and axon.

4. "The vasomotor system may be said to be composed of the vasomotor center, situated in the medulla, together with some accessory and subsidiary centers in the spinal cord, and vasomotor nerves. The nerves are divided into two classes, according as they increase or diminish the calibre of the arterioles; those which increase the caliber are vaso-dilators; those which diminish the same are known as vaso-constrictors. All nerves that in any way influence vessel caliber are classed under the general head of vasomotor." (Ott's *Physiology*.)

5. *Voluntary muscle* is more or less under the control of the will; *involuntary* muscle is not under the control of the will, it is rhythmical in its contractions, and is also characterized by peristalsis.

Further, *voluntary* muscle is striated, has long narrow fibers with cross striations and many nuclei beneath the sarcolemma. *Involuntary* muscle is non-striated, has spindle-shaped fibers, one nucleus centrally located, and no sarcolemma. The great exception is cardiac muscle, which is involuntary and also striated. *Voluntary muscle* is found in all the skeletal muscles, pharynx, diaphragm, larynx, external ear, and eye. *Involuntary muscle* is found in the alimentary tract from the middle third of the esophagus

to the anus, in the ducts of glands, in the trachea and bronchial tubes, within the eyeball, the internal urinary and genital systems, circulatory (except the heart) and lymphatic systems, and the capsules of some organs.

By *muscular co-ordination* is meant the harmonious action of individual muscles in a complicated muscular action. It is controlled by centers in the cerebellum.

Fatigue is caused by: (1) The consumption of those substances (particularly carbohydrates) which supply the muscle with energy; (2) the accumulation of the waste products of contraction, particularly sarco-lactic acid and carbon dioxide.

6. *Respiratory function.* "Respiration is the process by which oxygen is absorbed into the blood and carbon dioxide exhaled. The assimilation of the oxygen and the evolution of carbon dioxide takes place in the tissues as a part of the general nutritive process, the blood and respiratory apparatus constituting the media by means of which the interchange of gases is accomplished."

Residual air is the air which remains in the lungs after every effort has been made to empty them; it is equal to about 100 cubic inches.

Vital capacity is the amount of air which can be expelled from the lungs after the deepest possible inspiration; it is the sum of the complemental, tidal, and supplemental air, and is about 225 to 250 cubic inches.

7. BLOOD. *Composition:* Plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts). The *white corpuscles* consist of water and solids (proteid, leuconuclein, lecithin, histon, etc.). There are also *platelets*, which are very small, colorless, irregular shaped bodies, about one-fourth the size of the red corpuscle.

Specific gravity: 1055 to 1062. *Reaction:* Alkaline. *Amount in body:* About one-thirteenth of the body weight. *Time required for a complete circulation:* About 23 seconds.

MATERIA MEDICA AND THERAPEUTICS.

1. A *solvent* is a liquid which holds another substance in solution. *Three principal solvents:* Water, alcohol, and glycerine.

2. *Diaphoresis* is the process of perspiring. *Three diaphoretics:* Spirit of nitrous ether, dose 30 minims; Dover's powder, dose 7 grains; alcohol, dose of whiskey, 2 ounces, diluted.

3. *Two cardiac stimulants:* Aromatic spirit of ammonia, dose 30 minims; nitroglycerine, dose 1 minim.

4. *Iodine* is most frequently administered internally as

the iodide of potassium or sodium. Starch is the antidote to free iodine.

5. *The indiscriminate use of acetanilide* may cause: Collapse, chills, cyanosis, fatty degeneration of heart, liver, and kidneys, and destroys the hemoglobin-carrying efficiency of the red blood corpuscles.

6. *The dosage of medicines* is influenced by: Age, sex, weight, nationality or race, disease, pain, idiosyncrasy, body temperature, drug habits, method of administration, and the cumulative action of the drug.

7. *Cumulative action* is the property which some drugs have of producing more or less sudden and violent action, after single and successive doses have been taken with no untoward effect. *Example:* Digitalis; this produces fast and irregular pulse, gastroenteritis, small pulse, low blood pressure.

8. *Three antiseptics useful for internal medication:* Urotropin, salol, and thymol.

Urotropin is a white, crystalline powder, soluble in water, prepared by the action of ammonia on formic aldehyde. It is used as a genitourinary antiseptic.

Salol is the salicylic ether of phenol; it is a white, crystalline powder, nearly insoluble in water, but is very soluble in ether. It is used as an intestinal antiseptic, owing to its power of splitting up (in an alkaline medium) into salicylic acid and phenol.

Thymol is a phenol contained in oil of thyme; it occurs in large crystals, of aromatic odor; it is soluble in fats and oils; and liquefies when treated with chloral or camphor.

9. *Three indications for use of opium:* To relieve pain, to produce sleep, and to check excessive secretion.

10. *Hypodermoclysis* "is a method of applying remedial agents through the skin. As a rule, 0.6 per cent. normal salt solution is used—a dram of table salt to a pint of boiled and filtered water. The site preferred is the anterior wall of the abdomen or the ilio-lumbar region, above the ilium and below the ribs. Thorough asepsis is necessary in the technique. An ordinary fountain syringe with a moderate sized needle is all that is required. The solution is best used at a temperature of from 110° to 115° F., and from four to eight ounces are employed. The method is extremely useful in conditions of shock, hemorrhage, diarrhea, uremia and in toxic states generally." (Butler's *Materia Medica*, etc.)

CHEMISTRY.

1. Yeast fermentation of sugar produces alcohol (C_2H_5OH) and carbon dioxide (CO_2).

Cane sugar, under the influence of yeast, is slowly converted into dextrose and levulose, which are then fermented to alcohol and carbon dioxide.

Milk sugar is first inverted by yeast, and then alcohol is formed; this occurs slowly.

Grape sugar, under the influence of yeast, is converted into alcohol and carbon dioxide.

2. The *fixed oils* are glycerides, and are capable of saponification. The *volatile oils* are mostly hydrocarbons, and are not subject to the same decompositions as the glycerides.

Three fixed oils used in medicine: Castor oil, glycerine and oleic acid.

Three volatile oils used in medicine: Oil of peppermint, oil of anise, oil of cinnamon, and oil of gaultheria.

3. *Ammonia gas.* The molecule consists of three atoms of hydrogen chemically united to one atom of nitrogen, NH_3. It is a colorless gas, with a pungent and irritating odor and a caustic taste; it is very soluble in water, also in alcohol; it does not burn readily. It combines with water to form an alkaline liquid containing ammonium hydroxide. It combines directly with acids, without separation of hydrogen, to form ammonium salts:

$$NH_3 + HCl = NH_4Cl.$$

4. Cow's milk consists of:

Water	87.00
Solids	13.00
Fat	3.66
Milk sugar	4.92
Casein	3.01
Albumin	0.75
Proteins	3.76
Ash	0.70

5. UREA. *Chemical formula:* $CO(NH_2)_2$. About 500 grains of urea are excreted daily by an average adult.

PHYSICAL DIAGNOSIS.

1. *Physical signs of aneurysm of the thoracic aorta:* Sometimes a bulging in the precordial region, visible pulsation, with a thrill on palpation, localized dulness on percussion, and a "bruit" on auscultation. One radial pulse may show diminished volume and irregular rhythm. There may be tracheal tugging.

2. *Cardinal symptoms in diagnosis of appendicitis:* Pain, beginning near the umbilicus, and settling in right iliac fossa, near McBurney's point; rigidity of right rectus muscle; tenderness on pressure over McBurney's point; nausea or vomiting; obstruction to passage of feces or gas.

3. TOPOGRAPHY OF HEART AND ITS VALVES. A line from

the lower border of the second left costal cartilage (one inch from sternum) to upper border of third right costal cartilage represents the *base line;* the *right side* will be a line drawn from right side of upper limit to seventh right chondrosternal articulation; the *lower limit* is a line from this last point to the apex (in fifth intercostal space, three and one-half inches from mid-line); the *left side,* from left end of upper border to left of apex. The valves are: Aortic, mitral, tricuspid, pulmonary (and Eustachian and coronary).

The *aortic valves* are behind the third intercostal space, close to the left side of the sternum. *Pulmonary valves,* in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. *Tricuspid valves,* behind the middle of the sternum, about the level of the fourth costal cartilage. *Mitral valves* behind the third intercostal space, about one inch to the left of the sternum.

4. Normal temperature of the body is 98.6° F. Normal pulse rate is about 16 to 18 per minute.

5. Arteriosclerosis.

PATHOLOGY AND BACTERIOLOGY.

1. *Intoxication and infection.* "In one class of diseases the infecting microbe remains localized at the point of inoculation, and is never or only exceptionally found in the fluids of the body, the general symptoms of the disease being due to absorption of the toxic products. Such are true *Intoxications.* In other cases the microbe is found circulating in the blood throughout the body and finds lodgment in most of the organs. These are called *Infections.* Tetanus is the type of the first class; anthrax, of the second." (Stengel's *Pathology.*)

2. *Phagocytosis* is the property of certain cells (such as some of the white corpuscles) to ingest and destroy bacteria. Metchnikoff believes that *immunity* is due to the chemotaxis which exists between the phagocytic cells and microorganisms.

3. *"Thrombosis of the portal vein* is most frequently the result of infective inflammation of the vein (pylephlebitis), resulting from ulcerative enteritis, appendicitis, or similar processes involving the parts from which the portal blood is received."—(Stengel's *Pathology.*)

4. *Chronic gastritis* is most frequently the result of improper food (including alcoholic drinks).

5. *Pathological conditions of the lymphatic glands:* Inflammation, tuberculosis, syphilis, tumors, Hodgkin's disease, leukemia, lymphosarcoma, status lymphaticus, atrophy, hypertrophy, and degenerations.

6. *To demonstrate the amœba coli in a case of amebic dysentery:* "A satisfactory recognition of the parasite,

particularly in the hands of the novice, demands that he should see it send out pseudopodia; he should observe active movement. In order to do this, the material should be reasonably fresh. In the case of feces admixture with urine is to be avoided. A drop of the suspected material is placed upon a slide and a cover-glass applied. The slide may be gently warmed, or the microscope may be kept in a reasonably warm place, under which conditions movement will be more active. Fresh specimens may be best stained by mixing with the suspected material, placed upon a slide, a drop of a watery solution of toluidin blue. This reagent acts as a fixative and at the same time stains the amebas intensely and rapidly."—(Coplin's *Pathology.*)

7. *To demonstrate the efficiency of a germicide:* "Koch's original method of determining this was to dry the microorganisms upon sterile threads of linen or silk, and then soak them for varying lengths of time in the germicidal solution. After the bath in the reagent the threads were washed in clean, sterile water, transferred to fresh culture media, and their growth or failure to grow observed. This method also determines the *time* in which a certain solution will kill microorganisms, so is advantageous." (Macfarland's *Bacteriology.*)

8. *The Widal reaction:* "Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. . . . A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid movement inside of twenty minutes." (From Thayer's *Pathology.*)

9. *Bacteria most frequently causing puerperal infection are:* Streptococcus pyogenes, staphylococcus pyogenes aureus, gonococcus, bacillus coli communis, bacillus diphtheriæ, bacillus ærogenes capsulatus, bacillus typhosus.

ETIOLOGY AND HYGIENE.

1. Malaria is *caused* by the plasmodium malariæ, but *carried* by the anopheles mosquito. The cause of yellow fever is not yet determined, but it is *carried* by the stegomyia mosquito.

Prophylaxis of malarial fever. Individuals should use

mosquito netting around their beds and wire gauze in doors and windows so as to keep out the mosquitos as much as possible. During residence in malarial districts quinine should be taken every morning before breakfast. All pools, stagnant water, etc., where *anopheles* may breed, should be removed. All mosquitos, larvæ, etc., should be destroyed as far as possible. By staying indoors during dusk and darkness, opportunities for infection may be avoided. Occasional fumigation with formaldehyde or sulphur is also efficacious.

To prevent yellow fever in the tropics: All cases of the disease should be isolated; houses should be protected by mosquito netting; mosquitos should be killed; swamps should be drained.

2. Impurities in water may be classified as: (1) Mineral, (2) vegetable, and (3) animal. The presence of organic matter is deleterious, because it may indicate fecal matter, with pathogenic bacteria. The processes employed for the detection of the various impurities are too lengthy for description here, and also too technical and complicated for use by the practising physician.

3. *How* antitoxin produces immunity and effects cure is not known, but *theories* deduced from observed facts are as follows: "As the various pathogenic bacteria produce the causative toxins of their respective diseases, so the organic cells of the body, reacting under the stimulus of the poisons thus introduced, immediately proceed to elaborate defensive bodies, which if produced in sufficient quantities will neutralize the effects of the toxins. Residual antibodies remaining in the blood after recovery render the animal immune for a time against the disease. The immunizing and curative effects obtained by the injection of the blood serum of an immunized animal into the circulation of another animal are due either to direct chemical neutralization of the toxins themselves by the antibodies so introduced (Behring, Kitasato), or to a particular influence exerted by the antibodies upon the living cells of the organism which, being affected in two opposite directions, remain neutral to the disease (Buchner). Some authorities hold that these results are due to the conjoint action of leucocytic and chemical forces. Ehrlich's side-chain theory assumes that every toxin contains toxophore molecules having direct toxic action, and haptophore molecules which combine the toxophores with a similar combining group of molecules in the tissue cell of the attacked organism. The tissue cell molecules being destroyed by the toxophores, a rapid and profuse regeneration of similar molecules occurs in side chains, and these molecules overgrowing are carried into the circulation, becoming the

antitoxin, which acts by combining with the haptophores of newly arrived toxin, using up their combining power before they can reach the tissue cells." (Potter's *Materia Medica*, etc.)

4. Infantile paralysis is believed to be infectious, but the specific microorganism is not yet demonstrated. Quarantine, as for any other infectious disease, affords the best way of protecting the community.

5. *Hepatic abscess* is *caused* by: Microbes, ameba coli, parasites, biliary calculi, cholangitis, traumatism, and embolism, septic processes of circulatory or digestive tract. *Cardiac hypertrophy* is *caused* by: Arteriosclerosis, nephritis, prolonged muscular exertion, exophthalmic goiter, aortic disease, mitral regurgitation. *Edema of the lungs* is *caused* by: Infections, nephritis, arteriosclerosis, some cardiac lesions, pregnancy, and alcoholic excesses.

1. PRACTICE.

	MEASLES.	SMALLPOX.
Incubation	10 days.	12 days.
Prodromes	3 days. Coryza, cough, etc. Koplik's spots.	3 days. Rigor, high fever, headache, lumbar pains.
Character of eruption.	Bluish papules; swelling of face; discrete or confluent circular outlines.	Macules, papules, vesicles, and pustules; discrete or confluent.
Parts first affected	Forehead, face, or neck.	Forehead.
Desquamation	Furfuraceous	Large crusts.
Duration	7 to 10 days.....	3 weeks.
Complications and sequels.	Eye and lungs; tuberculosis.	Larynx and lungs.

2.

MYALGIA.	NEURALGIA.
Skin is normal.	Skin may be inflamed.
Pain is increased by muscular contractions.	Pain is increased by pressure.
No skin eruptions.	Frequently skin eruptions are present.

3. *Principal forms of insanity:* Mania, melancholia, paranoia, idiocy, imbecility, paresis, dementia, delirium. *Most common causes:* Heredity, civilization, alcohol, syphilis, narcotic drugs, severe mental strains, depressing emotions, shock, trauma, autotoxemia, organic brain diseases.

	CROUPOUS PNEUMONIA.	CATARRHAL PNEUMONIA.	PLEURISY.
1. Mode of invasion.	One or more severe rigors. Often vomiting.	Generally after bronchitis, or collapse, and without distinct rigors.	Frequently none, but sometimes several, not severe rigors.
2. Sensations about the chest.	Pain in the side at first, not stitch-like, but more dull and diffused.	Pains about the chest, but not specially localized.	Severe, stitch-like pain in side, increased on respiratory movements.
3. Cough.	Hacking, or in paroxysms.	Short, hacking, and painful.	Slight, and patient tries to repress it.
4. Expectoration.	Considerable; viscid, tenacious, "rusty."	Often less than before; not "rusty."	Absent, or very slight, and of no special characters.
5. Disturbance of breathing.	Very rapid breathing, and much perversion of pulse-respiration ratio, but not proportionate feeling of dyspnea until the later stages, when dyspnea is marked.	Rapidity of breathing increases when it occurs in bronchitis; dyspnea may be marked.	Quick, shallow breathing at first, but less disturbance of pulse-respiration ratio than in pneumonia. Later on, more or less actual dyspnea according to amount of pressure.
6. Degree of pyrexia.	Considerable; temperature usually high, 103°, 104°, 105° or more, and runs a regular course. Skin peculiarly hot and dry.	Temperature high, but there are considerable remissions, at irregular intervals.	No regularity in course of temperature. Skin not acridly hot.
7. Aspect of patient and general condition.	Marked flushing of face, often unilateral. Malar cyanosis. Herpes round mouth.	Face is flushed. Often much anxiety and restlessness, with loss of flesh and strength.	Nothing special. No particular prostration, or tendency to cyanosis unless dyspnea becomes marked.
8. Physical signs.	At first, fine crepitations, followed by signs of consolidation, viz., diminished movement, increased vocal fremitus, dulness, bronchial or tubular breathing, increased vocal resonance, etc. Usually one base is affected. The side is not notably enlarged, nor is there displacement of organs.	There may be signs of consolidation in scattered spots, with râles. Both lungs are usually involved in irregularly scattered patches.	At first friction-sound or fremitus, succeeded by signs of fluid, viz., side often enlarged, movements interfered with, diminished vocal fremitus, dulness occasionally movable, weak or suppressed breathing. Usually on one side, and often displacement of organs.
9. Course and termination.	(1) Often a marked crisis from 5th to 8th day; (2) death; (3) gangrene of lung; (4) abscess of lung.	No crisis, and course often prolonged or followed by acute phthisis.	No crisis, and course very variable.

(Wheeler and Jack's *Practice of Medicine.*)

5. *Average duration of the febrile stage,* in *typhoid fever,* is about three or four weeks; of *scarlet fever,* is about five or six days; of *measles,* is about five days; of *rheumatic fever,* is about one or two weeks; of *pneumonia,* is about nine or ten days.

6. Lightning pains, loss of knee-jerk, Argyll-Robertson pupil, optic atrophy and ptosis, gastric and other crises, ataxia, incoordination, and Romberg's sign.

7. *Hysteria.* The following summary of diagnosis is given by Anders and Boston: "A peculiar mental and physical condition, characterized by suggestibility of symptoms which may be of any character. The patient is usually a young adult who is emotional, irritable, and one who constantly complains and thinks of herself, and perverts everything which may occur as having something to do with her own condition. There may be headache, backache, pains in various portions of the limbs, numbness or pin-and-needle-like sensations, hemianesthesia or anesthesia anywhere, points of tenderness in the back, ovarian and mammary region, increases of reflexes, paralyses of various sorts, contractures, tremors, disturbance of vision, smell, and taste, and convulsive attacks which may assume almost any character. The most important point of all is the suggestibility of all the symptoms, their variance from day to day, and the fact that any or all may be removed by persuasion."

8. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs*: Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

The treatment consists of: Plenty of fresh air, sunshine, and sunlight, pure water, good food, exercise in moderation, and proper hygiene in general.

9. Scarlet fever, measles, and typhus fever.

10. Tonsillitis.

OBSTETRICS.

1. Impregnation is the result of the meeting of a live and healthy spermatozoon, with a live and healthy ovum, in a suitable medium (generally the Fallopian tube). During coitus the seminal fluid is ejected into the upper part of the vagina and against the cervix of the uterus; the spermatozoa enter the uterine cavity (either by the suction of the uterus or by their own vibratile motion) and so pass on to the Fallopian tube.

2. *Development of the fertilized ovum.* "(1) When the ovum is mature, two small cells are detached from the main body of cells; these are called polar globules. It was formerly supposed that these were associated with the disappearance of the germinal vesicle, but recent experiments have demonstrated that the germinal vesicle plays an active part in their formation. This can take place independently of fecundation. (2) The portion of the ovum remaining after the throwing off of the polar globules is called the 'female pronucleus.' (3) Fecundation is effected by the penetration of the head of one spermatozoon. This is called the 'male pronucleus.' (4) The male and female pronucleus coalesce. The ovum is now called the oösperm, or blastosphere. (5) The *segmentation* of the nucleus and vitellus, *i.e.* they both split into two masses, these into four, and so on until a large number of segments are formed. This is known as the morula, moriform body, or mulberry mass. (6) A clear fluid is secreted within the ovum, which presses these segments to the surface of the ovum, where they form a double layer of cells, differing somewhat in size. The outer and larger is termed the *epiblast* or *ectoderm*, and the inner and smaller the *hypoblast* or *endoderm*. Together they are known as the blastodermic vesicle. (7) There then appears upon the outside of the vitellus a small oval elevation, surrounded by a depression, which is called the *area germinativa*. (8) There appears in the area germinativa a small, dark line called the *primitive trace*. About this line will be grouped the various parts of the embryo, the rest of the ovum serving only as a covering and for nutriment. (9) A covering for this trace or embryo is now formed. Thus far the vitelline membrane has been sufficient. The embryonic line sinks into the center of the ovum, while the edges of the external blastodermic layer about the area close around it, inclosing it in a sac called the *amnion*. Between the amnion and the embryo, fluid at a later period is deposited; this constitutes the liquor amnii. The vitelline membrane then disappears."—(Landis's *Obstetrics.*)

3. *Meconium* is the name given to the stools of the newborn (or unborn) infant; they are of a green-black color, and are composed of intestinal mucus, bile, epithelial cells, cholesterin, vernix caseosa and phosphates. The continuous passage of meconium from the vagina of the parturient woman during labor indicates a breech presentation. Its discharge in undoubted head or transverse presentations is indicative of impending or actual death of the fetus.

4. In the nulliparous adult the uterus is about three inches long, about two inches wide at the upper part, and

about one inch thick. It is pear-shaped, and lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine, rectouterine, ovarian, and uterosacral. The arteries are the uterine and ovarian; the nerves are from the uterovaginal plexus, the hypogastric plexus, and the vesical plexus.

5. The *vitellus* is the yolk or germinal part of the ovum together with the substance intended for the nutrition of the embryo. The *allantois* is a fetal membrane developing from the lower part of the alimentary canal very early in fetal life; it enters into the formation of the urinary bladder and also of the umbilical cord and placenta.

The *amnion* is the innermost of the fetal membranes; it surrounds the fetus and is continuous with it at the umbilicus; it secretes the liquor amnii, and forms the sheath of the umbilical cord.

6. A woman usually menstruates about two or three months after her confinement if she *is not* nursing her child, and about seven months after the confinement if she *is* nursing her child.

7. Causes of sterility: Gonorrhea, absence or errors in development of any part of the genital tract, malformations of genitals, fistulæ, lacerations, obesity, alcoholism, pelvic inflammations, dyspareunia, inflammations of uterus, tubes, or ovaries, elongated cervix. The above all refer to the female, but the trouble may be with the male.

8. Climate, race, occupation, and mode of life.

9. It is not *proved* that maternal impressions will produce marks, defects and abnormalities in the fetus. Some *coincidences* have been observed.

10. Credé's method of prophylaxis consists in cleansing the eyes with warm sterile water, and then instilling into each eye a few drops of a two per cent solution of nitrate of silver. The eyes should be treated in this way two or three times a day so long as there is any danger of contracting ophthalmia.

GYNECOLOGY.

1. In *cystocele*, part of the bladder projects into the anterior vaginal wall, and a sound passed through the urethra into the bladder can be freely felt through the anterior vaginal wall; further, it may be impossible to empty

the bladder without pushing up the anterior vaginal wall.

In *vaginal hernia*, the bladder is not involved, the hernia will contain intestine or omentum or both, there may be an impulse on coughing.

In a *vaginal tumor* there will be none of the positive symptoms of the two other conditions.

2. *Prolapse of the uterus* is the condition in which the uterus lies low down in the vagina, but does not protrude through the vagina.

Differential diagnosis: In the case of *polypus* the body and fundus of the uterus are in their normal position in the abdomen, a sound can be passed into the uterus, the uterine and cervical canals are not obliterated, the polypus does not bleed easily, and is not particularly sensible to pain. The *inverted uterus:* shows absence of body and fundus from normal position, will not permit passage of a sound into uterine cavity, the uterine and cervical canals are absent, the inverted uterus tends to bleed easily, and is very sensible to pain. In *prolapse* the largest part of the tumor is above; the opening of the Fallopian tubes cannot be seen; a sound can be passed into the uterine cavity.

Treatment: The uterus should be replaced; the vagina packed with a tampon; a pessary or colpeurynter may be employed; where the round ligaments are relaxed Alexander's operation may be performed.

3. *Menorrhagia* is an excessive hemorrhage from the uterus at the ordinary menstrual periods.

Amenorrhea is absence of menstruation.

Dysmenorrhea is unduly painful menstruation.

4. GONORRHEAL VAGINITIS. *Symptoms:* Pain and burning in the vulva; pain and burning on micturition; dyspareunia; yellowish or greenish discharge, in which the gonococcus can be found; the vagina is hot, red, swollen, and tender. *Differential diagnosis* is made by the finding of the gonococci. *Treatment:* Rest in bed, salines, mild unirritating diet, bathing of external genitals, copious vaginal douches of bichloride of mercury 1:2000 three or four times a day; later, the vagina may be swabbed daily with a solution of nitrate of silver 1 to 5 per cent., or with a solution of potassium permanganate 1 per cent. *Complications*: Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomata of vulva, abscess of Bartholin's glands.

5. *Abdominal hysterectomy.* "The patient must be carefully prepared as for any other abdominal operation, but in addition the pubes and vulva must be shaved and thoroughly purified; the vagina should be douched for some

days previously, and an antiseptic dressing worn, and if need be the uterine canal should be curetted and disinfected with some powerful antiseptic.

"After anesthesia has been induced the Trendelenburg position is adopted, and an incision of suitable length made in the median line. The parts are then carefully explored, and if no adhesions exist an abdominal cloth is packed in over the intestines in order to protect and keep them from exposure and injury. If adhesions to omentum or gut are present they must be carefully divided; it is, of course, most desirable that a complete peritoneal covering should be secured for any adherent organs; omental grafts may be sometimes useful in this direction. The broad ligaments are then examined, and a decision made as to whether or not the ovaries and tubes are to be saved.

"A pedicle needle carrying a sufficient length of well-boiled silk is carried through the round ligament so as to secure the ovarian artery and veins, and tied as far away from the uterus as possible. A broad ligament clamp may then be placed in position close to the uterus, so as to prevent venous regurgitation, and the broad ligament is divided half-way down. It is often possible and desirable to pick up the divided end of the ovarian artery on the face of this section and secure it separately, while the little artery which accompanies the round ligament should also be carefully secured. The ovarian artery on the other side is next dealt with in a similar fashion. A transverse cut is now made across the front of the uterus, involving merely the serous membrane and connecting the two ends of the incisions in the broad ligaments; the peritoneum below this transverse cut is detached, together with the bladder, from the cervix, and the intraligamentary space is thereby opened up on either side. In this will be found the uterine vessels, and it may be possible to see and isolate the uterine artery before securing it by ligature. Care must be taken in this part of the operation to keep close to the uterus, as the ureter comes forward from behind under the uterine artery to reach the bladder, lying about the level of the os internum. The uterine vessels are in this way carefully secured and divided.

"The uterus is now merely held by the connection between the vagina and cervix and the peritoneal reflection in Douglas's pouch. If a supra-vaginal operation will suffice, the surgeon cuts across the neck of the uterus in such a way as to fashion two flaps, and finally the peritoneum behind is divided. A few small vessels will probably need to be secured on the face of the uterine stump. This having been effected, the uterine flaps are stitched carefully together so as to bury the open cervical canal; the uterine

stump is then covered in by uniting the divided portions of peritoneum. This line of sutures is carried up on either side so as to secure the two layers of the broad ligament; the final result is that the pelvic floor is covered in by a continuous layer of peritoneum, showing a sutured incision which runs transversely from one side to the other. The usual peritoneal toilette follows, and the abdomen is generally closed entirely, no drainage being required."—(Rose and Carless' *Surgery.*)

6.

SHOCK.	SECONDARY HEMORRHAGE.
1. Generally follows a prolonged operation or one in which the abdominal viscera have been exposed to the air or more or less roughly handled; it is also likely to occur in women who are weak and exhausted physically.	1. May follow either a severe or a simple operation; the general condition of the patient does not influence its occurrence.
2. The patient is listless and apathetic and there is seldom any tendency to toss about in the bed.	2. The patient is restless and her mind apprehensive and anxious.
3. Seldom recurrent attacks of syncope.	3. Recurrent attacks of syncope frequent.
4. Pulse and general condition not satisfactory immediately after operation and the symptoms of collapse come on suddenly.	4. The patient recovers from the anesthetic in a good condition, but later on the pulse gradually becomes accelerated, the temperature falls below normal, and collapse finally intervenes.
5. General stimulating treatment tends to improve the pulse.	5. The pulse progressively grows worse despite all that is done to stimulate the heart and secure reaction.
6. The blood findings are negative.	6. There is a moderate leukocytosis (15,000 to 25,000); the number of red cells and the percentage of hemoglobin are diminished (Martin and Hare); the blood-plaques are increased in number; and the coagulation time of the blood is more rapid.

(Ashton's *Gynecology.*)

SURGERY.

1. An *odontoma* is a tumor composed of tooth tissue. *Varieties:* (1) Follicular odontomes, or dentigerous cysts, generally arise from the follicles of the permanent molars. (2) Fibrous odontomes, due to thickening of the tooth-sac. (3) Cementome, due to enlargement and ossification of the capsule. (4) Compound follicular odontome, from the capsule. (5) Redicular odontome, from the papilla. (6) Composite odontome, from dentine, cement, and enamel.

2. A cervical rib may not give any signs or symptoms; when such are present they are due to pressure on brachial plexus or some blood-vessel. It may cause subclavian aneurysm, neuritis, or gangrene of hand. There may be pain, weakness of the arm, trophic disturbances, or obliteration of the pulse. The *x*-rays confirm the diagnosis.

3. *Coxa* vara is a condition in which the neck of the femur is bent downwards so that the angle between the neck and shaft of femur is lessened; the hip joint is healthy. *Causes:* Rickets, impacted fracture of neck of femur, slipping of the epiphysis, and atrophy of the neck of the femur, with osteoarthritis.

4. *Varieties of spina bifida:* (1) *Myelocele,* in which the central canal of the spinal cord lies open on the skin surface of the body (incompatible with life). (2) *Syringomyelocele,* in which the central canal is dilated, so that a portion of the spinal cord is spread out over the interior of the sac. (3) *Meningomyelocele,* in which the meninges remain adherent to the skin, fluid collects within them, and the spinal cord and nerves run down the posterior part of the sac. (4) *Meningocele,* which is a protrusion of the membranes containing cerebrospinal fluid but neither nerves nor spinal cord. (5) *Spina bifida occulta,* in which there is no tumor except perhaps a lipoma or a dermoid with hair.

5. Tabetic arthropathy, or an osteoarthritis.

The *joint signs* are: "(1) Very rapid and painless onset usually occurs. (2) A great synovial distention is the first feature. (3) All the signs of osteoarthritis, viz., enlargement of the bone ends, clipping of articular margins coarse grating, quickly follow. (4) Marked absorption of bone, with consequent shortening or deformity. (5) Massive heaping up of new bone as an outgrowth round the articular margins, in the hypertrophic varieties. (6) Disorganization or dislocation of the joint from a yielding of the ligaments and destruction of the joint surfaces. (7) Absence of all pain or tenderness is a conspicuous and characteristic feature."—(*Synopsis of Surgery.*)

6. In middle meningeal hemorrhage trephining is often of value because the hemorrhage may be located, the clot turned out, and the artery ligated. It is often difficult to know exactly where to trephine, for the main hemorrhage often occurs not at the point of application of the injury, but on the other side of the cranium.

7. In *epithelioma of the lower lip* there should be thorough and early excision; incisions should be at least half an inch from the tumor. The glands in the submaxillary and submental triangle should also be removed. Dowd's operation is recommended.

8. In *ulcer of the duodenum* the symptoms are very similar to those found in ulcer of the stomach; but in the former condition there is less tendency to vomit, the pain does not come on till some time after food has been swallowed (and has had time to pass the pylorus), and blood in the stools is more common. All of these points are due to physiological and anatomical reasons based on the relative position of the stomach and duodenum. A special sign of duodenal ulceration is the so-called "hunger pain" which occurs at the end of digestion, when the unmixed acid of the gastric juice is passing into the duodenum. This pain is relieved by taking food, for when this occurs the pylorus closes, and the gastric juice is for the time retained in the stomach to be mixed with the food, while the alkaline duodenal and pancreatic secretions are stimulated.

9. *Contraindications to surgery in gallstone in the common duct:* (1) Obstructive jaundice, because operation is then dangerous, owing to the possibility of fatal oozing of blood. (2) In non-patency of the common duct.

10. A *ranula* is a cyst under the tongue, due to dilatation of one of the sublingual ducts.

PEDIATRICS.

1. POLIOMYELITIS. *Symptoms:* "The onset of the affection varies; it may be acute, subacute, or chronic; it is usually sudden, with an attack of mild fever of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is paralyzed. Rarely the paralysis may be preceded by convulsions. The paralysis may affect both arms and both legs, the legs alone, or only one of the four extremities; it may, very rarely, be a hemiplegia. As a rule, however, the leg suffers more frequently than the arm; in paralysis of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or, if so, only temporarily, and anesthesia or numbness cannot be detected. The temperature of the paralyzed limb is low and the

part is cyanosed in appearance. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone. The reflex movements are impaired or abolished. The electro-contractility by the faradic current is abolished in the paralyzed parts. With the galvanic or constant current the 'reactions of degeneration' are developed."—(Hughes' *Practice of Medicine.*)

Treatment: "During the febrile stage the patient should be placed at rest in bed and all the secretions rendered free. If the affection is suspected at this period the limbs should be wrapped in cotton-wool and ergot administered to lessen the spinal congestion. Counterirritation is unnecessary. As soon as the febrile reaction has subsided and the paralysis becomes manifest the child should be well fed and taken outdoors once daily. Gentle friction should be applied to the affected muscles at first, followed later by the hot spinal douche and mild galvanism. Internally, quinine, belladonna, ergot, and potassium iodide may be of value. Later, as improvement takes place, tincture of nux vomica, ℥i to iii, three times daily, or hypodermic injections of strychnine sulphate, gr. 1/100 to 1/16, according to the age, twice a week, and faradism to the paralyzed muscles, are to be used. Means should be taken to prevent deformities."—(Hughes' *Practice of Medicine.*)

2. Dysentery. *Cause:* The *Bacillus dysenteriæ. Treatment:* Rest in bed, a dose of salts, castor oil, with laudanum, irrigation of the colon, liquid diet, ipecac, and serum treatment.

OPHTHALMOLOGY AND OTOLOGY.

1. *Glaucoma* is a diseased condition of the eye, produced by increased intraocular pressure, and resulting in excavation and atrophy of the optic disc, and blindness. It is due to increase of the contents of the eye, hypersecretion, retention, old age, gout, rheumatism, nephritis. *Symptoms:* Visual disturbances, increased ocular tension, hazy and anesthetic cornea, sluggish and dilated pupil, shallow anterior chamber, ciliary neuralgia, cupping of optic disc, blindness. *Treatment:* Miotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

2. *Phlyctenular keratitis* "is usually associated with phlyctenular conjunctivitis in children of scrofulous diathesis, but may occur in others. It is characterized by one or more small cysts found on the limbus of the conjunctiva

and extending upon the cornea. The symptoms are acute pain, photophobia, lacrimation, and the characteristic bundle of vessels, with a yellow crescent at the apex, its concavity toward the apex. Blepharospasm is present and may be severe. The treatment consists of good food, fresh air, and the administration of tonics and stimulants. Locally, atropin and warm compresses should be used, and the eye douched with mercuric chlorid solution 1:8000. Later, iodoform or calomel may be dusted in the eye and massage with the yellow salve may be practised. Absorption of the vessels may be hastened by the instillation of eserin, dusting with iodoform, and the application of a binder."—(Gould and Pyle's *Pocket Cyclopedia.*)

3. The acoustic nerve has its superficial origin between the pons and restiform body, the floor of the fourth ventricle, by the lineæ transversæ. Its deep origin is from the lateral angle of the fourth ventricle and from the inner auditory nucleus. At the bottom of the internal auditory meatus it divides into the cochlear and vestibular nerves. The *cochlear* supplies the cochlea and posterior semicircular canal; the *vestibular* supplies the vestibule and superior and external semicircular canals.

MEDICAL JURISPRUDENCE.

1. A physician is not at all bound to accept a professional call; but if he accepts he is bound to continue in attendance until the patient no longer requires his services, or he is discharged. He can leave during the continuance of the condition for which he was called only after giving ample notice of his intention to discontinue his services, and allowing a reasonable time for the patient to obtain the services of another physician. The physician undertakes to use proper skill, care, and judgment in diagnosing and treating the case, and also to give full instructions as to how the patient may be best cared for. The patient undertakes to allow the physician ample opportunities to make his diagnosis, to give him all information in his power, to obey instructions, and to pay a proper fee. The physician is not allowed to divulge anything that he learned while in professional attendance, provided such knowledge was necessary to the successful conduct of the case.

Malpractice is a failure on the part of the medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil* malpractice. But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice.*

2. The following, which admirably answers this question, is from Witthaus and Becker's "Medical Jurisprudence":

(1) A physician should refuse to testify as an expert unless he is conscious that he is really qualified as an expert.

(2) After accepting the responsibility, his first duty should be to make a diligent examination and preparation for his testimony, unless it be upon a subject with which he is familiar, and which he is satisfied that he has already exhausted, by reading the best authorities that he can find, and by careful reflection upon particular questions as to which his opinion will be asked.

(3) Where he is to make an examination of facts, such as the post-mortem examination of a body, a chemical analysis, or an examination of an alleged insane person, he should insist upon having plenty of time and full opportunity for doing his work thoroughly. He should take particular pains to make his examination open and fair, and, if possible, should invite opposing experts to cooperate with him in it.

(4) He should be honest with his client before the trial in advising him and giving him opinions, and upon the trial should observe an absolutely impartial attitude, concealing nothing, perverting nothing, exaggerating nothing.

(5) On the preliminary examination as to his qualifications as a witness, he should be frank and open in answering questions. He should state fully the extent and the limits of his personal experience and of his reading upon the subject, without shrinking from responsibility, yet without self-glorification.

(6) He should be simple, plain, and clear in his statement of scientific facts and principles, avoiding the use of technical language, and trying to put his ideas in such form that they will be grasped and comprehended by men of ordinary education and intelligence.

(7) He should avoid stating any conclusions or principles of which he is not certain, but having an assurance that he is right he should be firm and positive. He should admit the limitations of his knowledge and ability. Where a question is asked that he cannot answer, he should not hesitate to say so, but he should refuse to be led outside the subject of inquiry, and should confine his testimony to those scientific questions which are really involved in the case, or in his examination of the case.

(8) He should always bear in mind that at the close of his testimony an opportunity is usually given him to explain anything which he may be conscious of having said which requires explanation, and partial statements which need a qualification to make them a truth. This is the

physician's opportunity to set himself right with the court and with the jury. If the course of the examination has been unsatisfactory to him, he can then, by a brief and plain statement of the general points which he has intended to convey by his testimony, sweep away all the confusion and uncertainty arising from the long examination and cross-examination, and can often succeed in producing for the first time the impression which he desires to produce, and can present the scientific aspects of the case briefly and correctly.

STATE BOARD EXAMINATION QUESTIONS.

KENTUCKY STATE MEDICAL BOARD.

ANATOMY

1. (*a*) Describe the spinal cord, and (*b*) give its length, weight, points of beginning and ending in the spinal canal.
2. How many pairs of nerves are given off from the spinal cord?
3. (*a*) Locate and describe Peyer's glands, and (*b*) state where they are largest and most numerous.
4. What blood-vessels carry blood from the heart to and from the lungs?
5. Give the origin and distribution of the great sciatic nerve.
6. Describe the lymphatics of the liver.
7. Locate and describe the small intestine; state where it begins, where it terminates, and name the divisions.
8. Describe the esophagus, its structure, length, place of beginning and termination.
9. Name, locate and describe the bones of the arm and forearm.
10. (*a*) What bones form the pelvis, and (*b*) state the difference between the false and true pelvis.

PHYSIOLOGY.

1. Describe the medulla oblongata and discuss its functions.
2. Describe the digestion and assimilation of proteins.
3. Tell what you know of (*a*) the manufacture, (*b*) functions and (*c*) final disposition of white blood corpuscles.
4. Give in detail the functions of the kidneys.
5. Give the structure and functions of bone marrow.
6. (*a*) Discuss the essentials in the ventilation of a

school room, (*b*) a bed room, and (*c*) the dangers of, and (*d*) tests for impure air.

7. (*a*) Differentiate between striated and non-striated muscles. (*b*) Give examples.

8. (*a*) Describe the sympathetic nervous system. (*b*) Give its functions.

9. (*a*) Describe the development of the humerus. (*b*) Of the temporal bone.

10. (*a*) Describe the most important vestibule of the body, and (*b*) give its functions.

BACTERIOLOGY.

1. (*a*) Describe in detail the method of immunizing a person against typhoid fever. (*b*) What is the dose for a child weighing 50 pounds?

2. (*a*) Describe the Widal reaction. (*b*) Give its value as a diagnostic symptom in typhoid fever.

3. (*a*) Describe the diphtheria organism; (*b*) its staining characteristics. (*c*) Give method of detecting diphtheria carriers.

4. Describe the organism of syphilis.

5. (*a*) Describe method of securing specimen for examination for malaria. (*b*) Differentiate the three varieties of the malarial organism.

6. Differentiate the ova of (*a*) *Ascaris lumbricoides*, (*b*) hookworm, (*c*) *Oxyuris vermicularis*.

7. How would you identify gonococci?

8. Give method of staining sputum for tubercle bacilli.

9. Describe the tetanus bacillus.

10. Describe the meningococcus.

SURGERY.

1. (*a*) Differentiate between hydrocele, scrotal hernia, and varicocele. (*b*) What treatment would you advise in each?

2. How would you treat a compound, comminuted fracture of the olecranon process?

3. (*a*) Differentiate between fracture of the vault and base of the skull. (*b*) What treatment would you advise in each?

4. (*a*) How would you diagnose an hypertrophied prostate gland? (*b*) What treatment would you advise?

5. Differentiate between intestinal obstruction, acute appendicitis and tubercular peritonitis.

PATHOLOGY.

1. (*a*) Describe healing by granulation. (*b*) To what conditions does it lead?

2. Give the pathology of a gangrenous, perforated gall-bladder.

3. (*a*) Describe the gross appearance in pyosalpinx, and (*b*) what is the usual infecting organism?

4. Name and describe three varieties of malignant tumors.

5. (*a*) Describe bone necrosis. (*b*) What is a sequestrum. (*c*) An involucrum?

SKIN, HYGIENE, MEDICAL JURISPRUDENCE, MENTAL AND NERVOUS DISEASES.

1. Discuss and diagnose lupus vulgaris.

2. Discuss and diagnose psoriasis.

3. Name the varieties of eczema.

4. What are the conditions necessary for a model sleeping room?

5. Give special hygienic conditions required for factories in which women and children are employed.

6. What would you say as to the fitness of water for drinking purposes which contains nitrites and nitrates?

7. (*a*) Name as many nuisances dangerous to health as you can which are frequently found about cities. (*b*) About country homes.

8. What principal measure would you use to prevent the spread of the infectious diseases?

9. (*a*) What medico-legal complications might arise due to an erroneous diagnosis of pregnancy? (*b*) How would you avoid them?

10. Give the etiology of multiple neuritis.

OPHTHALMOLOGY, OTOLOGY, AND LARYNGOLOGY.

1. Give some of the conditions that would cause you to advise iridectomy.

2. (*a*) What is a staphyloma? (*b*) Give cause.

3. Give cause and symptoms of chronic dacryocystitis.

4. (*a*) Diagnose a case of empyema of frontal sinus. (*b*) How would you manage it?

5. (*a*) Define aphonia. (*b*) Give some of its causes.

6. Give etiology and symptoms of hyperemia of the labyrinth.

7. (*a*) What are the usual causes of rupture of the membrana tympani? (*b*) What symptoms would you expect to follow?

8. What symptoms would lead you to make a diagnosis of acute circumscribed otitis?

9. What are the symptoms of postnasal adenoids? (*b*) What means would you employ for relief?

10. (*a*) Under what conditions would you intubate? (*b*) Give detailed technique.

MEDICAL RECORD.

ETIOLOGY AND PHYSICAL DIAGNOSIS.

1. Give the etiology of vertigo.
2. What are most common causes of varicose ulcers of the leg?
3. Give the etiology of rachitis.
4. Give the etiology of lung abscess.
5. Give the most probable etiological factors in the causation of cholelithiasis.
6. Give the diagnosis of Grave's disease.
7. Give the diagnosis of psoriasis.
8. Give the diagnosis of spontaneous intracerebral hemorrhage (apoplexy).
9. Describe the various kinds of pulmonary rales and give the significance of each.
10. Give diagnosis of aortic regurgitation.

PRACTICE AND MATERIA MEDICA.

1. (*a*) Give etiology of acute lobar pneumonia in the adult, with physical signs of the different stages. (*b*) How many stages of the disease, in order of occurrence? (*c*) Give treatment for all. (*d*) What remedy is considered a specific by some authors?
2. (*a*) Name different kinds of pneumonia in children. (*b*) Give diagnosis and treatment of each kind.
3. (*a*) Define hookworm disease. (*b*) Give causation. (*c*) Mode of infection. (*d*) Treatment. (*e*) What new remedy have we, and how is it used? (*f*) Does hookworm ever simulate other diseases, and of so, what?
4. (*a*) Diagnose and treat acute indigestion. (*b*) If at all, when would you administer opiates? (*c*) By what method would you use them?
5. (*a*) Differentiate between acute and chronic nephritis. (*b*) Differentiate between chronic interstitial and parenchymatous nephritis. (*c*) Give treatment for acute and chronic nephritis, both medical and dietetic.
6. (*a*) Discuss the use of radium as a therapeutic agent. (*b*) In what diseases would you prescribe digitalis, and what precautions, if any, would you take in its use?
7. (*a*) Do you know of any specifics in medicine? (*b*) If any, name three of them, giving dose and indications for their use.
8. (*a*) How would you avoid salivation after giving calomel? (*b*) What is the usual dose of calomel? (*c*) Would you give the entire dose at once or divide it?
9. (*a*) How would you prepare a tasteless dose of castor oil? (*b*) How best give turpentine in typhoid fever, if used for some time?

10. Would you recommend any drug or drugs to differentiate between typhoid and malarial fever? If so, name them, and how would you use them?

OBSTETRICS AND GENECOLOGY.

1. Name (*a*) the female internal organs of generation, (*b*) giving function of each.
2. (*a*) What is podalic version? (*b*) Cephalic version?
3. (*a*) Give etiology of adherent placenta. (*b*) What precautions would you use in delivering one?
4. Give symptoms of pregnancy at fifth month.
5. What changes take place in the female economy at puberty?
6. How would you manage a case of antepartum hemorrhage?
7. (*a*) Give symptoms of ovarian cyst. (*b*) What treatment would you advise and (*c*) why?
8. (*a*) What is the most frequent cause of cervical ulceration? (*b*) What are the symptoms?
9. Define (*a*) menopause, (*b*) metritis, (*c*) salpingitis, (*d*) mastitis and (*e*) menstrual cycle.
10. (*a*) What antiseptic precaution would you use in the eyes of the new born, and (*b*) why?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

KENTUCKY STATE MEDICAL BOARD.

ANATOMY.

1. "The *spinal cord* is the elongated portion of the cerebrospinal axis contained in the spinal canal. Its length is about sixteen to eighteen inches, extending from the medulla above to the lower border of the first lumbar vertebra below, where it terminates in the cauda equina by a slender prolongation of gray substance, called the conus medullaris. It presents two enlargements, the upper or cervical, extending from the third cervical to the second dorsal vertebra, and the lower about the position of the second or third dorsal vertebra. It is divided into two lateral halves by the anterior and posterior median fissures, united in the center by the commissure. The lateral portions are again subdivided by the antero-lateral and postero-lateral fissures into the anterior lateral and posterior lateral columns, and posteriorly a narrow fissure separates the posterior median column from the posterior median fissure. The gray substance occupies the center

of the cord, and is arranged into two crescentic masses connected together by the gray commissure. The posterior horn forms the apex cornu, from which arises the posterior root of the spinal nerves. The anterior horn is thick and short, and affords origin to the anterior root of the nerves. The gray commissure contains throughout its whole length a minute canal the central canal, or ventricle of the cord, continuous above with the fourth ventricle." (Young's *Handbook of Anatomy.*) The spinal cord weighs about one and a half ounces.

2. Thirty-one pairs of spinal nerves are given off from the spinal cord.

3. *Peyer's patches* are aggregations of solitary glands, measuring from about half an inch to three inches in length; they are found mainly in the ileum, but also occur in the duodenum, and jejunum; they are situated lengthwise in the intestine, and are located opposite to the mesenteric attachment. Each patch is surrounded by a group of the crypts of Lieberkühn. There are said to be from 30 to 50 of these patches in the human intestine. As a rule, they have no villi on their surface.

4. The *pulmonary artery* conveys the venous blood to the lungs. The *pulmonary veins* convey oxygenated blood to the heart. The *bronchial arteries* supply blood for the nutrition of the lungs.

5. *The great sciatic nerve* arises from the sacral plexus, and passes out of the pelvis through the great sacrosciatic foramen, below the pyriformis muscle; it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus, and adductor magnus *muscles.*

6. "*The lymphatics of the liver* are numerous, and consist of a superficial and a deep set. The former pass in various directions. Thus a large number go to the hepatic glands in the lesser omentum; others pierce the diaphragm and finally end in the right lymphatic duct; others (a few) go to the lumbar glands. As regards the deep set, some following the hepatic veins and inferior vena cava, end in the thoracic duct; others, following the portal veins, end in the hepatic glands. The efferents from the hepatic glands in the lesser omentum accompany the hepatic artery, and end in the celiac glands." (McLachlan and Skirving's *Applied Anatomy.*)

7. The *small intestine* is situated in the abdominal cavity. It begins at the pyloric end of the stomach, in the epigastric region and ends at the ileocecal valve in the lower part of the right lumbar region. Its average length is about 23 to 25 feet. It is divided into three portions, the duodenum, the jejunum, and the ileum. The duodenum is the first part of the small intestine, it is about ten inches long, and extends from the pylorus to the left side of the body of the second lumbar vertebra. The jejunum and ileum form the coils of the small intestine and are covered by the great omentum; they form the remainder of the small intestine, the upper two-fifths being the jejunum and the lower three-fifths the ileum; there is no line of demarcation between these two parts. The coils of the jejunum and ileum are suspended from the posterior abdominal wall by the mesentery. The wall of the small intestine is composed of four coats, a serous, muscular, submucous, and mucous.

8. The *esophagus* is a muscular canal, about nine or ten inches long, and extending from the lower border of the pharynx (at the upper border of the cricoid cartilage) to the stomach. It passes down along the front of the spine, through the superior and posterior mediastina, through the esophageal opening in the diaphragm, and ends in the cardiac orifice of the stomach (opposite the tenth dorsal vertebra). It is generally in the median line, but it curves to the left at the root of the neck and again at the esophageal opening in the diaphragm. It is composed of a general fibrous covering on the outside, then a muscular coat consisting of two layers, an outer longitudinal layer and an inner circular layer; inside this is a submucous coat of areolar tissue; and the esophagus is lined by a mucous coat which is covered by stratified squamous epithelium.

9. "The HUMERUS, or arm-bone, the largest and longest bone of the upper extremity, consists of a shaft, head, neck, greater and lesser tuberosities, and lower extremity.

"The *shaft*, cylindrical above, flattened and prismoid below, becomes twisted in the middle, and presents: A rough triangular surface about the middle of its outer surface for insertion of the deltoid muscle, and a musculo-spiral groove for the musculo-spiral nerve and superior profunda artery, on each side of which arise the external and internal heads of the triceps muscle.

"The *upper extremity* presents—the head, forming nearly a sphere, projecting upward, backward, and inward, articulating with the glenoid cavity; the anatom-

ical neck, immediately beneath, is slightly grooved for the attachment of the capsular ligament; greater tuberosity, external to the head and lesser tuberosity, with three facets from before backward for attachment of supraspinatus, infraspinatus, and teres minor muscles; lesser tuberosity, smaller but more prominent than greater, is anterior to head, for the subscapular muscle; bicipital groove, passes downward and inward between the two tuberosities and lodges the long tendon of biceps; the anterior bicipital ridge, bounds the groove in front and receives insertion of pectoralis major muscle; the posterior bicipital ridge receives the latissimus dorsi and teres major; the surgical neck, including the head, neck, and both tuberosities; a rough impression near the center of the inner border for the coraco-brachialis muscle; nutrient canal, below and directed toward the lower extremity.

"The *lower extremity* presents from within outward the following: Internal condyloid ridge, extending upward from the condyle; internal condyle, more prominent than external, gives origin to the flexors and pronator radii teres; epitrochlea, an eminence separating the trochlea from the internal condyle; trochlea, a pulley-like articulating surface for greater sigmoid cavity of ulna; coronoid fossa, a small depression bounding the trochlea in front, and receiving the coronoid of the ulna in flexion; olecranon fossa, a larger depresssion behind, and receiving the olecranon process of ulna in extension; supra-trochlear foramen, sometimes formed by perforation of one fossa into the other; radial head, or capitellum, a smooth, rounded eminence articulating with cup-like depression on head of radius; external condyle, less prominent, gives origin to the extensors and supinators; external condyloid ridge, extending upward on the shaft from the condyle.

"It *articulates* with three bones—scapula, radius, and ulna. (Young's *Handbook of Anatomy.*)

"The RADIUS is a long bone, shorter than the ulna, situated on the outer side of the forearm, the upper end small, the shaft slightly curved, and the lower end expanded to form part of the wrist joint. It consist of shaft, upper and lower extremity. The *shaft* is prismoid, slightly curved, and presents: An *internal border*, sharp and prominent, for interosseous membrane; an *anterior border*, marked at its upper third by an *oblique line*, for attachment of flexor longus pollicis, supinator brevis, and flexor sublimis digitorum; *anterior surface*, affords attachment above for flexor longus pollicis, below for pronator quadratus, and presents at the junc-

tion of middle and upper two-thirds a *nutrient foramen* directed upward; *posterior surface* gives attachment at upper third to supinator brevis, and at middle third to extensors of thumb.

"The *upper extremity* presents: *Head*—a cup-like cylindrical cavity, for articulation with capitellum of humerus, and on its side an articulating surface for lesser sigmoid cavity of ulna and orbicular ligament, which nearly surrounds it; *neck*, the constricted portion below the head; *bicipital tuberosity*, below and to inner side, divided by a vertical line into a rough surface posteriorly, for attachment of biceps tendon, and smooth surface anteriorly for bursa.

"The *lower extremity*, large, expanded, and quadrilateral, presents: *Carpal articular surface*, smooth, concave, triangular depression divided by an antero-posterior ridge into an outer facet for scaphoid bone and inner for semilunar; *sigmoid cavity*, a shallow concavity at inner side of carpal end, for articulation with ulnar head; *styloid process*, projects obliquely downward from the external surface, for attachment by its apex to external lateral ligament of wrist-joint, and by its base to insertion of supinator longus muscle. Its outer surface is marked by two *grooves* for extensors of thumb. The *posterior surface* of the lower extremity is also marked by three *grooves* from without inward for the following: Ext. carpi radialis longior and brevior in first, ext. secundi internodii in second, and ext. indicis, ext. communis digitorum, and ext. minimi digiti in third. This surface has also attachment of posterior ligament of wrist."—(Young's *Anatomy.*)

"The ULNA is a long bone to the inner side of the forearm, and consists of a shaft and an upper and lower extremity. It forms the greater part of the articulation with the humerus, but does not enter into the formation of the wrist-joint, being excluded by the interarticular fibro-cartilage.

"The *shaft* is prismatic above, smooth and rounded below, and presents: *Anterior surface*, gives attachment to the deep flexors and pronator quadratus; *nutrient foramen* on anterior surface, directed upward toward the elbow-joint; *posterior surface* marked above by an *oblique line* for part of supinator brevis, above which is smooth triangular surface for anconeus muscle, and the lower third for extensor muscles of the thumb; *external border*, sharp in middle two-thirds, for attachment of interosseous membrane.

"The *upper extremity* is large and irregular, and

presents: *Olecranon process* (head of elbow), projects upward and forward, its apex being received into the olecranon fossa of the humerus in extension of the forearm; its upper border has rough impression for the triceps muscle; its lateral borders are grooved for external and internal lateral ligaments; coronoid process, smaller than olecranon, projects forward from anterior surface, being received into coronoid fossa of humerus in flexion. Its *supper surface* forms part of the great sigmoid cavity. Its *under surface* has rough impression for insertion of brachialis anticus, and has, at its junction with the shaft, the *tubercle of the ulna* for the oblique ligament. Its *outer surface* is the lesser sigmoid cavity. Its *inner surface* gives attachment to the internal lateral ligament, and the flexor digitorum sublimis, flexor profundus digitorum, and one head of pronator radii teres. *Greater sigmoid cavity* is a large, semi-lunar depression between the olecranon and coronoid processes, divided into two unequal lateral parts by an elevated ridge. It is continuous on the outer side with the lesser sigmoid cavity and articulates with the trochlear surface of the humerus. *Lesser sigmoid cavity* is an oval, concave, articular depression, external to the coronoid process, for articulation with the head of the radius. Its prominent extremities give attachment to the orbicular ligament.

"The *lower extremity* is small and cylindrical and presents: *Head*, an external, rounded, articular process, for the triangular fibro-cartilage below and the sigmoid cavity of the radius externally; *Styloid process*, projects from the posterior and internal part of the extremity, its apex gives attachment to the internal lateral ligament of the wrist, and it is marked at its root by a depression between it and the head, for attachment of the fibro-cartilage; *groove*, upon the posterior surface, for passage of extensor carpi ulnaris It articulates with two bones—humerus and radius." (Young's *Anatomy*.)

10. The *pelvis* is formed by the two ossa innominata, the sacrum and the coccyx; each os innominatum is made up of ilium, ischium, and pubis.

The *false pelvis* is that expanded portion of the pelvis above the iliopectinal line and the upper margin of the symphysis pubis. The *true* pelvis is the part beneath this plane. It is smaller, and has more perfect walls than the false pelvis.

PHYSIOLOGY

1. The *medulla oblongata* is the lowest part of the

encephalon, and is continuous below with the spinal cord. It extends from the lower margin of the pons to the lower margin of the foramen magnum. It lies in the basilar groove of the occipital bone; its dorsal surface is between the cerebellar hemispheres. It forms the lower part of the floor of the fourth ventricle. It is about one inch long, half inch wide, and half inch thick. It has anterior and posterior median fissures, which are continuous with those of the spinal cord.

The *functions of the medulla oblongata* are: (1) It is a conductor of nervous impulses or impressions from the cord to the cerebrum, from the brain to the spinal cord, also of co-ordinating impulses from the cerebellum to the cord; (2) it contains collections of gray matter which serve as special nerve centers for the following functions or actions; respiration, salivary secretion, mastication, sucking, deglutition, speech production, facial expression; it also contains the cardiac and vasomotor centers.

2. *Proteids* are digested in the stomach (by the pepsin of the gastric juice) and in the small intestine (by the trypsin of the pancreatic juice).

During digestion the proteids are split up into proteoses, peptones, polypeptides and amino-acids. The amino-acids are believed to be taken as such by the epithelial cells and carried to the blood of the portal capillaries. Another view is that in the intestinal epithelium the amino-acids are built-up again into proteins such as are found in the blood. There are three theories of the further history of the proteids. According to one of them (the theory of Voit), "the protein of the tissues, living or organized protein, is to be differentiated from the absorbed circulating protein. It is only in this circulating protein, which is assumed to be present in the fluids of the body, the blood and lymph, that catabolic changes take place. These changes take place under the influence of the living cells. The more resistant organized protein is not supposed to undergo catabolic changes. If any of it does, it is cast off into the fluids of the body, and thus becomes circulating protein, undergoing catabolic changes in precisely the same manner. It is obvious that a small part of the absorbed protein must be utilized to replace the waste of the organized protein and to subserve the process of growth. This portion is termed tissue protein." (Lyle's *Physiology.*)

3. *White blood corpuscles* are *formed* in the spleen, lymph glands, and lymphoid tissue; also from other white cells by direct cell-division in the blood stream;

the eosinophiles may be derived from the bone marrow. Their *fate* is uncertain: it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their *functions* are (1) to serve as a protection to the body from the incursions of pathogenic microrganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

4. The *functions of the kidney* are: (1) To secrete (or excrete) urine; (2) to regulate the reaction of the urine; (3) the formation of hippuric acid; (4) regulation of the composition of the blood plasma by excretion of abnormal or toxic substances; and (5) the production of an internal secretion. The mechanism of the *secretion of urine by the kidneys* is twofold: (1) By filtration, most, if not all, of the fluid is eliminated, and also inorganic salts; this depends upon blood pressure, and takes place in the glomeruli. (2) By cell activity and selection, in the cells of the convoluted tubules, the urea, and principal solids are eliminated.

5. BONE MARROW. "*Red marrow* is the connective tissue which occupies the spaces in the cancellous tissue; it is highly vascular, and thus maintains the nutrition of the spongy bone, the interstices of which it fills. It contains a few fat-cells and a large number of marrow-cells. The marrow cells are ameboid, and resemble large leucocytes; the granules of some of these cells stain readily with acid and neutral dyes, but a considerable number have coarse granules which stain readily with basic dyes like methylene blue. Among the cells are some smaller nucleated cells of the same tint as colored blood corpuscles. These are termed erythroblasts. From them the colored corpuscles of the blood are developed. There are also a few large cells with many nuclei, termed giant cells or myeloplaxes. *Yellow* marrow fills the medullary cavity of long bones and consists chiefly of fat-cells with numerous blood-vessels; many of its cells also are the colorless marrow-cells just mentioned." (Halliburton's *Physiology.*)

6. (*a*) *The essentials in the ventilation of a schoolroom* are that there must be 1,000 cubic feet of space for each individual, that the air in this space must be changed three times in an hour, that the air must be warmed to 60° to 65° Fahr., and that it must be moistened and purified (or at least strained to remove excessive dust. "There is considerable difference of opin-

ion as to the best locations for inlets and outlets, and as the conditions are necessarily different in every case and so many factors are to be considered, it is difficult to lay down any general rules. It should be an aim, however, to have the air well distributed and to have no direct draughts from the inlets either upon the occupants or to the outlets. Usually the outlets should be located near the top of the room, owing to the tendency of the used air to rise, and because, in unventilated rooms, the foulest air for some time after its contamination will be found nearest the ceiling. The products of combustion from lights, etc., will also practically all be in the upper strata of air. If, however, provision is or can be made for a constant and sufficiently strong aspirating force in the outlet ducts, it may be advisable to withdraw the used air from near the floor level and below the inlet openings, though not in too close proximity to them, since in this way a more thorough distribution of the incoming air and a greater dispersion of its contained heat are secured. The location of the inlets should depend on the temperature of the incoming air; if it is cold it should be admitted near the ceiling, so that it may diffuse and be partially warmed before reaching the inmates of the room; if it is warmed it may come in near the floor or below the middle level of the room." (Egbert's *Hygiene and Sanitation.*)

(*b*) In a *bedroom*, for adults, proper ventilation may be secured by having double windows, or double panes of glass, with an opening at the bottom of the outer and at the top of the inner one, so that the fresh air may enter in an upward current; or by placing a board under the lower sash so that fresh air can enter in the middle.

(*c*) The *dangers of impure air* are: Drowsiness, headache, digestive disturbances, mental dullness, and disease or liability to take disease. The chief danger to health is in the increase of carbon dioxide, the presence of crowd-poison, dust, irrespirable gases, and bacteria.

(*d*) The relative amount of carbon dioxide in the air is taken as an indication of its purity; not because the carbon dioxide is itself harmful in the amounts generally encountered, but because it is readily estimated and is a fair indicator of the purity of the air.

Pettenkofer's method of determining the percentage of carbon dioxide in the air: A large cylindrical container of known capacity, say, 15 liters, is filled with the air to be examined; a known volume of barium hydroxide is then added and shaken up with the air.

The carbon dioxide combines with the barium hydroxide to form a barium carbonate, which is insoluble, and also incapable of acting upon an indicator. The barium hydroxide employed is of known strength, *e.g.*, it may be of such strength that 1 c.c. of the solution neutralizes 1 c.c. of carbon dioxide at normal temperature and pressure. If then we find that 10 c.c. of the barium hydroxide has been neutralized by the carbon dioxide present in the air, we know that 10 c.c. of carbon dioxide is present in 15 liters or 15,000 c.c. of the air examined.

7. *Voluntary muscle* is more or less under the control of the will, does not contract rhythmically, does not evince peristalsis; *involuntary* muscle is not under the control of the will, it is rhythmical in its contractions, and is also characterized by peristalsis.

Further, *voluntary* muscle is striated, has long narrow fibers with cross striations and many nuclei beneath the sarcolemma. *Involuntary* muscle is nonstriated, has spindle-shaped fibers, one nucleus centrally located, and no sarcolemma. The great exception is cardiac muscle, which is involuntary and also striated. *Voluntary muscle* is found in all the skeletal muscles, pharynx, diaphragm, larynx, external ear, and eye. *Involuntary muscle* is found in the alimentary tract from the middle third of the esophagus to the anus, in the ducts of glands, in the trachea and bronchial tubes, within the eyeball, the internal urinary and genital systems, circulatory (except the heart) and lymphatic systems, and the capsules of some organs.

8. "*The sympathetic nervous system consists of* (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers."—(Gray's *Anatomy.*)

Function: It has a controlling influence over the secretion of most of the glands, the lacrimal, the salivary, the sweat glands, the glands of the stomach and intestines, the liver, the kidney, etc.; it presides over the circulation by regulating the caliber of the blood-vessels and the action of the heart; it influences respiration; and, all involuntary muscles, those of the digestive ap-

paratus, of the genitourinary system, of the hair follicles (pilomotor nerves), are under its control to a great extent.

9. *Development of the humerus.* "Ossification occurs from a primary center in the shaft and six or seven secondary centers in the extremities. In the upper extremity centers appear in the head, great tuberosity, and sometimes in the small tuberosity, which, after fusing together, join the shaft about the twentieth year. In the lower extremity centers appear in the trochlea, capitellum, and outer and inner condyles, the three former of which, after coalescing, unite with the shaft in the seventeenth year. The inner condyle forms a distinct epiphysis which unites somewhat later." (Gerrish's *Anatomy.*)

Development of the temporal bone. "The squamosal and tympanic bones ossify in membrane, each from a single center; the petrous portion and styloid process in cartilage, the former from four centers, the latter from two. The fetal tympanic bone forms an incomplete ring, which incloses the tympanic membrane. It is open above with its free ends united to the squamosal. The defect in the ring due to this opening above is known as the notch of Rivinus. Two tubercles, one growing from the front and the other from the back of this ring, meet in the floor of the meatus, enclosing a foramen, which is gradually (though not always) closed, and thus the tympanic plate is formed. At birth the mastoid process, articular eminence, and tympanic ring are flat, the glenoid fossa is shallow, and the hiatus Fallopii opens at the genu of the canal." (Gerrish's *Anatomy.*)

10. *The vestibule of the internal ear.* "The vestibule is situated on the inner side of the tympanum, behind the cochlea and in front of the semi-circular canals. It is somewhat ovoid in shape, and measures about one-fifth of an inch in length. On its outer wall is the fenestra ovalis, closed by the base of the stapes and membrane; on its inner wall is the fovea hemispherica, pierced by minute holes, for the filaments of the auditory nerve and opening of the aqueductus vestibuli; on its roof is a small depression, the fovea semi-elliptica; behind are the five openings of the semi-circular canal, and in front an opening which communicates with the cochlea." (Ashby's *Notes on Physiology.*) The *function of the vestibule*—It is supposed to be concerned with equilibrium.

BACTERIOLOGY.

1. *Method of immunizing against typhoid.* The vaccine is administered subcutaneously over the insertion

of the deltoid muscle; the site of the injection should have been previously painted with tincture of iodine; intramuscular injections are to be avoided; after the injection has been given the iodine is wiped off with a pledget of cotton and alcohol; no dressing is needed; the syringe and needle must be sterile; three such injections are given at intervals of about ten days; the dosage for adults (of 150 pounds weight) is 500 million bacilli for the first injection, and 1000 million bacilli for the second and third injections; each of these amounts is contained in about fifteen minims or one cubic centimeter; for a child weighing fifty pounds the dosage should be about one-third of the above, or a little more, for children take the injections very well.

2. (*a*) The Widal test for typhoid fever "depends upon the fact that serum from the blood of one ill with typhoid fever, mixed with a recent culture, will cause the typhoid bacilli to lose their motility and gather in groups, the whole called 'clumping.' Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. . . . A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid movement inside of twenty minutes."—(From Thayer's *Pathology*.)

(*b*) Its diagnostic value is believed by some to be great; others place little reliance on it. It may be absent in cases of typhoid fever; it may be present for several months after an attack of typhoid; the reaction may not be obtained till the third week of the disease; it may be present in other diseases or in perfectly healthy persons. The above have all been urged as objections; certainly only positive results have any value at all.

3. The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not

form chains; they have no flagella, are non-motile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain with any aqueous solution of an anilin dye, they also stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue; Neisser's stain is also recognized.

Diphtheria carriers can only be detected by the finding of the diphtheria bacilli in the secretions of their nose and throat. A sterile swab is rubbed over any visible membrane on the tonsils or throat and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appear as short, thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts. *Methods of culture:* The bacillus of diphtheria grows upon all the ordinary culture media, and can be readily obtained in pure culture. Loeffler's blood serum, particularly with the addition of a little glucose, is an admirable medium for the rapid growth of this bacillus. The medium should be alkaline and not less than 20° C.

4. Syphilis is due to infection by the *Treponema pallidum*, also called the *Spirochæta pallida*. This is a slender spirillum, with regular turns, the curves varying in number from three or four to twelve or even twenty; it is about 4 to 20 mikrons long, actively motile, with a fine flagellum at each pole; it is flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur.

5. *In examining for malaria:* "Prepare some perfectly clean and very thin cover slips, and remove all traces of grease. Cleanse the skin of the finger-tip or ear with soap and water, and then with alcohol and ether. Make a *small prick* in the skin. Wipe away the first drop of blood, leaving a perfectly dry surface, so that subsequent drops will not run. Squeeze out a tiny drop about the size of a large pin's head. Touch

the apex of this drop with the center of a cover glass, and immediately drop it, face downward, on a perfectly clean slide. Make several such preparations, and reject all those in which rouleaux are present. It is absolutely essential that the red corpuscles should lie flat. Examine with a 1/12 immersion lens and rather feeble illumination. Look in the red corpuscles for the presence of small black specks, often rod-like and showing slow movements of translation. These are surrounded by clear areas. One may also see in the center of some of the red cells clear ameboid areas which show no pigment. Rosette forms may also be visible. These forms of the parasite are always present in cases of malaria which have not had quinine. Other varieties are only met with in some chronic cases. Of these there are two chief forms: (1) The crescentic, (2) the flagellated. These are easily recognized. The crescentic bodies are highly refractile, rather longer than a red blood corpuscle, and about 2μ in diameter. Particles of pigment may be recognized in the parasite and also in some of the ordinary leucocytes."—(Hutchinson and Rainy.)

TERTIAN.	QUARTAN.	ESTIVO-AUTUMNAL.
Cycle in man 48 hours.	3 days.	24-48 hours.
Ameba in red cell active.	Sluggish.	Smaller than tertian.
Decolorizes red cell rapidly.	Slowly.	Hemoglobin deeper in tint.
Causes red cell to swell.	Size preserved or diminished.	Red cells shrivel.
Outlines not sharply defined.	Sharp.	
Pigment in fine granules, abundant, in motion.	Coarser, fewer.	Pigment in fine peripheral granules, not often in motion.
Spores 15-20, usually 18, small.	6-12, larger.	Small, 6-30, usually 18.
Flagella more numerous.		Less numerous.
Ring forms common, early, more distinct than those of estivo - autumnal.		Common, ring and disk form less distinct.

—(Thayer.)

6. The *ova* of *Ascaris lumbricoides* "are elliptical with a thick (4μ) transparent shell and an external albuminous coating which forms protuberances; the ova measure 50μ to 70μ in length, 40μ to 50μ in breadth; they are deposited before segmentation; the albuminous coating is stained yellow by the coloring matter of the feces, but it is sometimes absent. The egg cell is unsegmented, it almost completely fills the shell, and its nucleus is concealed by the large amount of coarse yolk granules."

The *ova* of *Ancylostoma duodenale* "appear to have a single contour. Under high powers this appears double, but they are the outer and inner surface of the true (chitinous) egg-shell. Internal to this is the extremely delicate yolk-envelope, a kind of skin secreted by the egg cell around itself for protection. The eggs are oval, with broadly rounded poles, 56μ to 61μ by 34μ to 38μ. In *fresh* feces they contain four granular nucleated segmentation masses of the ovum separated by a clear space from the shell."

The *ova* of *Oxyuris vermicularis* "are oval, asymmetrical, with double-contoured shells, and measure 50μ to 55μ by 16μ to 25μ; they are deposited with clear, non-granular tadpole-like embryos already developed." (From *The Animal Parasites of Man*, by Fantham, Stephens, and Theobald.)

7. *Gonococci* are recognized by their form (diplococci), their location (intracellular), and their staining properties (eosin and methylene blue, and being decolorized by Gram's method); they are exceedingly difficult to cultivate, and this feature renders differentiation from the *Micrococcus catarrhalis* easy, inasmuch as the latter grows readily on simple culture media.

8. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods while all other bacteria will appear blue. The tubercle bacillus is rod shaped, is from 1½ to 3½ mikrons in length and about one-third to one-half a mikron in

breadth, is a strict parasite, is not motile, and has no flagella. It is slightly curved, does not form spores, is not liquefying; is nonchromogenic; is aërobic; it resists acids; it grows well on blood serum; stains well by Ehrlich's, Ziehl-Neilsen's, or Gabbett's method; it is Gram-positive.

9. *The bacillus of tetanus* is characterized by its peculiar spore, formed at one end of the bacillus and giving it the appearance of a pin; it is purely anaërobic, and cannot be developed at all in the presence of oxygen. It generally comes from the soil, and is found in penetrating wounds. It appears in two forms, the spore-bearing form, as described above, and the vegetative form, which is a short bacillus with rounded ends, and which may occur singly or in pairs, or may form long filaments. It grows in gelatin stab cultures in the middle of the medium and the colonies look something like a fir tree; its growth is slow, and a disagreeable odor is at the same time emitted. In bouillon, it grows near the bottom of the tube, and produces gases.

10. The *meningococcus* is a small, non-motile, non-flagellate coccus; it does not form spores, does not liquefy gelatin, is aërobic, and pathogenic; it appears in diplococcus groups, and may be found within or outside the cells; it stains readily with the ordinary anilin dyes, but is Gram negative. It grows readily upon meat infusions, and especially so on media to which ascitic fluid or blood serum has been added.

SURGERY.

1. In *hydrocele* the tumor begins in the scrotum and may ascend to the inguinal region; does not vary very much in size, except to steadily increase; is translucent; is dull on percussion; gives no impulse on coughing.

In *hernia* the tumor begins in the inguinal region and may descend to the scrotum; is very variable in size, and may be reducible, or disappear on lying down; is not translucent; is not dull on percussion; gives an impulse on coughing as a rule.

In *varicocele* the swelling feels like a bag of worms; it may empty when the patient lies down; there is an impulse on coughing or straining, but no translucency.

Treatment of hydrocele.—The fluid may be withdrawn with trocar and cannula; this will have to be repeated.

Tapping, followed by injection of strong antiseptics, such as carbolic acid, or iodine. The sac may be excised either wholly or partially.

For *hernia*, Bassini's operation (or some modification of it) is recommended.

For *varicocele* the best treatment is to remove the varicose veins between double ligatures.

2. *In compound comminuted fracture of the olecranon process* "the wound should be irrigated with a few gallons of physiological sterile salt solution, and the edges of the wound trimmed of devitalized tissue. Internal fixation of the fragments should not be performed at the initial operation in compound cases, though it may be possible to retain the fragments in position by suturing the fascia covering the posterior surface of the process in closing the wound. A secondary operation may be done after the wound (rendering the condition compound) has healed and the danger of infection has passed. Following a firm internal fixation of the fragments the upper extremity may be immobilized with an internal right angle splint." (Preston's *Fractures and Dislocations.*)

3. FRACTURE OF BASE OF THE SKULL. The *Signs* are those of (1) injury to the brain, (2) escape of cranial contents, (3) injury of cranial nerves. (1) *Injury to the brain* may be of the nature of concussion, compression, or laceration. (2) *Escape of cranial contents*, which may be blood, cerebrospinal fluid, or rarely brain itself. 1. *Hemorrhage* manifests itself in various situations, according to the position of the fracture. In the *anterior fossa* the bleeding may be from the nose or into the orbit, or may pass back into the pharynx, be swallowed, and subsequently vomited. The eye may be pushed forward and pulsate if the cavernous sinus be ruptured. In the *middle fossa* blood usually runs from the ears; but slight bleeding from the ear may be caused by minor injuries, such as rupture of the membrana tympani, tearing of the lining of the auditory canal, and fracture of the tympanic bone. In the *posterior fossa* a hematoma may form behind the mastoid process. 2. The escape of *cerebrospinal fluid* is a certain sign that a fracture communicates with the subdural space. It may appear in the same situations as hemorrhage, but is usually found escaping from the ear owing to fracture of the petrous bone. The fluid is limpid, specific gravity 1005, with no albumin, but containing pyrocatechin, which gives the same reaction as sugar with Fehling's solution. The amount which escapes may be small or very large, but as a rule it soon ceases. (3) *Injuries to the cranial nerves vary* according to the site of fracture. That most commonly involved is the facial, in the aqueductus Fallopii, and the paralysis may come on immediately from rupture, or after two or three weeks from the pressure of callus.

Treatment: The chief aim of treatment is to prevent sepsis. The ear must be mopped out with an antiseptic, and then kept covered with an antiseptic dressing, as if it were a wound. The patient must then be kept quiet, the bowels opened with a purge, and an icebag applied to the head. The diet should be low, and a return to active life not permitted for six weeks. If septic meningitis occurs the patient is bound to die. (From *Aids to Surgery.*)

Fissured fractures of the vault are due to direct injuries, such as blows, or to indirect injury, such as compression, which bursts the skull. If simple there are no definite signs; if compound the fissure can be seen and felt. The prevention of sepsis forms the main line of treatment. Callus may form at the site of fracture and produce traumatic epilepsy.

Depressed and punctured fractures are due to direct violence; usually affect the vault; may be simple, compound, or comminuted. The outer table may be depressed without the inner being broken, in such places as the frontal sinus. Rarely the inner table is broken and depressed without fracture of the outer. As a rule both tables are broken. The inner suffers most damage, as it is less supported; the force of the blow is more diffused by the time it reaches the inner; also the momentum of the striking body is less, and the débris of the outer table increases the size of the penetrating body.

Symptoms: If there is a wound, the fracture and depression may be seen, and blood, cerebrospinal fluid, or brain, may be escaping. If there is no wound a careful examination is necessary, as a hematoma may form and obscure the depression. In cases of doubt an incision should be made.

In a *simple depressed fracture* there is usually some concussion, which is followed by compression from hemorrhage in the neighborhood. The depressed bone also causes compression later by the *spreading edema* it sets up in the brain. Death may result quickly, or the patient may recover and then become the subject of traumatic epilepsy from irritation of the cortex. If the depression is over the motor area convulsions or paralysis are quickly induced.

In a *compound depressed fracture* the blood escapes and does not produce compression. Concussion may or may not be present. The advent of sepsis produces inflammation of the bone, membranes, and brain, which may be limited if the drainage is free; but if not death soon follows from compression by the inflammatory

exudation. During the stage of compression a hernia cerebri is formed. If the depressed fragments are early removed and asepsis is maintained the patient has a good chance, unless the brain itself is severely injured.

Treatment.—In all cases, except the saucer-like depressions which occur in young infants, it is necessary to elevate or remove the depressed fragments, stop all bleeding, and disinfect the wound. Symptoms should never be waited for, because, although the patient may recover without operation, the depressed bone may cause traumatic epilepsy or insanity. The skin is shaved and purified, and a large flap is turned down to expose the fractured area, or if a wound is present it is enlarged. Comminuted fragments are removed, and sharp edges which press on the dura mater are clipped away with Hoffmann's forceps. If an elevator cannot be introduced under the depressed bone a trephine hole is made through the nearest sound bone, the elevator introduced, and the bone prised up. The piece of bone removed with the trephine should be replaced. If the dura mater is torn it should be stitched up and then the scalp flap is sutured without a drain, unless oozing is still going on. If the fracture has been compound it is better to drain it for twenty-four hours. In punctured fractures the hole must be enlarged by trephining, so as to remove the depressed spicules. After operation the patient must be kept quiet in a darkened room on liquid diet for a few days.—(*Aids to Surgery.*)

4. *Prostatic hypertrophy is characterized by:* Slowness in starting urination; difficult micturition; frequency of micturition, particularly at night; the presence of residual urine, as may be demonstrated by catheterizing the patient just after he has urinated; dull, aching pain in the perineum and above the pubes; enlargement of the lateral lobes of the prostate; there may be cystitis and retention of urine. *Palliative treatment* consists in: Mild and unirritating diet, avoidance of alcohol, taking plenty of milk or water, or other diluent. Alkalies and sedatives should be taken, also urotropin or other antiseptic so as to prevent cystitis. Regular catheterization, at least once a day, preferably in the evening, and with due aseptic precautions. *Operative treatment* is excision of the prostate gland.

5. *Acute appendicitis.*—The recognition of a typical case depends upon a few cardinal symptoms—viz., the acute development of severe pain in the right iliac fossa, coming on in a person previously healthy and usually under forty years of age; appendicular tenderness, unilateral induration, fever, vomiting and constipation, or, more rarely, diarrhea.

Acute tuberculous peritonitis.—As in appendicitis, so in tuberculous peritonitis, pain, tenderness, and fever are present, but in the latter the onset is more gradual, and the signs of tumor and increased resistance in the ileocecal region are absent. Movable dulness may be present in the tuberculous affection, but not in appendicitis until the peritonitis is general. The lungs generally show lesions in tuberculous peritonitis.

Acute intestinal obstruction.—When this is due to intussusception there may be signs of a tumor, but not at McBurney's point; the tenderness over the site of the mass is less intense, while the frequent bloody discharges that are seen in this condition, accompanied by tenesmus, do not characterize appendicitis. When obstruction is caused by strangulation stercoraceous vomiting is apt to occur; pain, local tenderness, and signs of a tumor appear, but not at McBurney's point. (Anders' *Practice of Medicine.*)

PATHOLOGY.

1. (*a*) *Healing by granulation* occurs (1) when the edges of the wound have not been brought together, (2) when the edges have been so damaged that sloughing occurs, (3) when sepsis has prevented healing by first intention. Exudation of plasma and leucocytes occurs, followed by fibroblasts and budding from the capillaries, thus forming granulation tissue. The dead tissues or sloughs are separated, and a red area of granulation is then exposed. The deeper layer of granulation tissue is converted into fibrocicatricial tissue, which contracts, and so the wound gradually lessens in size. In the meantime epithelium spreads in from the edge over the surface, and so the scar is completed.—(*Aids to Surgery.*)

(*b*) It leads to cicatrization.

2. *Pathology of gangrenous perforated gall-bladder.*—Should the gall-bladder have been previously normal or only slightly diseased and non-adherent it may become considerably, sometimes very much, enlarged; but if previously the seat of cicatrization from chronic inflammation no enlargement may occur; in this case it is usually united to adjacent tissues and organs by adhesions. The wall of the gall-bladder is softened, swollen, edematous, congested, and usually very dark reddish, greenish, or blackish in color. The mucosa is congested and desquamated and covered with a fibrinopurulent, sometimes also hemorrhagic, exudation. In many cases there is more or less ulceration, especially toward the fundus in consequence of the relatively

poorer vascular supply of the fundus and the gravitation of gallstones. The ulceration may proceed through the wall and lead to perforation. The cystic duct is usually occluded even in the absence of gallstones. The contents consist of turbid, bile-stained, fibrinopurulent, sometimes sanguinolent fluid; gallstones are present in about 80 per cent. . . . The infiltration of the gall-bladder is widespread and may lead to extensive dissection of the different coats, the separation, for instance, of the mucosa from the underlying coats or extensive sloughing. . . . When a large section of the gall-bladder becomes necrotic the term gangrenous cholecystitis is not inaptly applied. The lesions resemble those just described, with the addition of complete necrosis or gangrene of a variable portion of the gall-bladder; the gangrene usually begins at or near the fundus and spreads toward the neck; in some cases it begins about a gallstone more or less firmly embedded in the wall of the gall-bladder.—(From *Modern Medicine*, by Osler and McCrae.)

3. *Pyosalpinx.*—"The dilation of the tube into a cyst is the final stage of salpingitis. The tumor formed by a dilated tube is seldom larger than a pear, although a pyosalpinx may reach to the umbilicus. The tube is commonly contorted, winding round the upper and back part of the ovary, the outer part of the tube being the more dilated. The wall is generally thickened, but at one or more spots it may be thinned. The thinning is not due to tension, but to ulceration, and this ulceration may take place at a part where the tube is not dilated, and may perforate and cause death. The mucous membrane is overgrown, thickened, edematous, injected so as to be purple in color, and ecchymosed, or it may be slate colored; there may be calcareous plates and nodules in the mucous membrane. In some cases there has been overgrowth of gland tissue. The ovary is generally enlarged."—(Herman's *Handbook of Gynecology.*)

The usual infecting organism is the gonococcus.

4. A *sarcoma* is a malignant connective tissue tumor; the others are all innocent. A sarcoma consists of cells, between each of which a minute quantity of intercellular tissue can be demonstrated. The cells differ in size and shape in different growths. Bone and cartilage may be developed in any of them. It is always developed from mesoblastic tissue; it may be at first defined or encapsuled, but always in its later stages infiltrates the surrounding tissues. The blood supply is always abundant, even to producing a pulsating tumor. The vessels are only clefts between the cells of the growth,

so that interstitial hemorrhage is frequent, and dissemination by the veins is rendered easy. It follows from this that secondary growths occur first in the lungs, unless the primary growth is in the portal area. Other organs may be affected after the lungs. Occasionally lymphatic glands are implicated, especially in melanotic sarcoma, lympho-sarcoma, sarcoma of tonsil, testis, and thyroid. Secondary changes, such as myxomatous, fatty and hemorrhagic, may occur. A sarcoma when cut appears homogeneous and varies according to its vascularity from the grayish-white of a fibrosarcoma to the deep maroon of a myeloid sarcoma. Sarcoma may be congenital or appear at any age. The species are determined according to the prevailing type of cell.

Rodent ulcer is a carcinoma beginning in sebaceous glands. It generally occurs in patients over forty and is of very slow growth. It begins as a smooth, rounded knob in the skin about the nose, eyelids, orbital angles or cheeks, slowly increasing in size. In time ulceration occurs. The ulcer has a smooth, depressed base covered with ill-formed granulations and bounded by a slightly raised, indurated, rolled over edge. There is little discharge if sepsis is prevented and little or no pain. The lymphatic vessels and glands are not affected, and dissemination does not occur. The ulcer spreads and destroys surrounding structures; even bone is not spared, so that the brain may ultimately be exposed.

Epithelioma, or squamous-celled carcinoma, may arise on any surface covered with stratified epithelium. It usually arises in the middle aged or elderly, but may also occur in the young. It often results from long continued irritation and may arise in old scars or ulcers. It may appear in one of three forms: (1) A wartlike growth with an indurated base; (2) a small circular ulcer with raised, rampartlike edges; (3) an indurated fissure. The growth extends to the deeper structures; the surface ulcerates and becomes foul from contamination with putrefactive organisms. The nearest lymphatic glands always become infected sooner or later, and a fatal termination occurs rapidly unless treatment is early and thorough. Secondary deposits, except in the glands, are rarer than in glandular carcinoma. The glands sometimes undergo cystic change, invade the skin, ulcerate, become foul, and may cause death by scondary hemorrhage from ulceration into large blood vessels.—(*Aids to Surgery.*)

5. "*Necrosis*, or gangrene of bone, is death of a portion of bone *en masse*. The dead portion (*sequestrum*) varies in size from a small superficial flake, such as follows

suppurative periostitis, to a mass representing the entire shaft of the bone, such as not infrequently follows acute osteomyelitis. The causes are acute and chronic inflammations of the periosteum, bone and medulla. The *sequestrum* separates from the living bone by a line of ulceration or demarcation much the same as in gangrene of soft parts. The surrounding living bone usually undergoes a condensing ostitis and becomes much harder than normal. Small and superficial sequestra may be discharged spontaneously through a sinus, which inevitably exists in all but very small aseptic sequestra, in which complete absorption without suppuration is possible. If the necrotic mass is large or centrally located spontaneous discharge is impossible and suppurative inflammation may continue for years. The dense bone which surrounds the sequestrum in these cases is called the *involucrum*, and the sinus leading from the surface down to the cavity in which the sequestrum lies is called the *cloaca*."—(Stewart's *Surgery*.)

SKIN, HYGIENE, MEDICAL JURISPRUDENCE, MENTAL AND NERVOUS DISEASES.

1. *Lupus vulgaris* is a tuberculous cellular new growth, characterized by reddish or brownish patches consisting of papules, nodules, and flat infiltrations, usually terminating in ulceration and scarring. The affection occurs most often upon the face and is due to local infection by the tubercle bacillus. It is distinguished from syphilis and epithelioma by its occurrence before puberty, slow course, history and concomitant signs of the tuberculous diathesis, soft nodules, multiple and superficial ulcers, absence of pain, yellowish, shrunken and hard scars and slight discharge. The condition is chronic and in small patches may be entirely cured.—(*Pocket Cyclopedia.*)

2. *Psoriasis* is a common chronic inflammatory disease of the skin, characterized by variously sized lesions, having red bases, covered with white scales resembling mother of pearl. It affects by preference the extensor surface of the body. The lesions are infiltrated, elevated, clearly defined, covered with white, shining, easily detachable scales which, upon removal, reveal a red, punctate, bleeding surface. The eruption is absolutely dry, and itching is usually absent.—(*Pocket Cyclopedia.*)

The special points of value in reference to diagnosis are the lesions of variable dimensions, all being capped with pearly white scales; borders severely outlined; ten-

dency to convalescence, with the presentation of bleeding points upon removal of scale.

3. *Varieties of eczema.*—Eczema erythematosum, E. papulosum, E. vesiculosum, E. pustulosum, E. rubrum, E. squamosum, E. fissum, E. sclerosum, E. verrucosum, E. papillomatosum.

4. The sleeping room should be as large as possible, with the maximum of sunshine and fresh air; it should face the south, or east, or southeast, and should contain no hangings and have as few "dust catching" contrivances as possible; it should not lead into a bathroom. There should be a separate bed for each person, and, preferably, each person should have his own room. There should be provision for moderate heating of the bedroom and a warm dressing room may be necessary in cold weather.

5. "In addition to the ordinary hygiene of factories and workshops, such as proper space, air, ventilation, water supply, lighting, heating, drainage and plumbing, ordinary cleanliness and absence of dust care should be taken that women and children do not work too long at a time or at occupations involving the use of poisonous or deleterious materials; that there are ample toilet and lavatory accommodations, and that these are separate and away from those used by men; there should also be opportunity to sit, and women should not be expected to remain standing for long periods of time."—(Scott's *State Board of Physiology and Hygiene.*)

6. "*Nitrates* may be found in pure water from deep wells in the chalk, but as a rule are due to oxidation of organic matter of animal origin. Even if accompanied by only a small proportion of organic matter nitrates in water from a source open to suspicion must be regarded as oxidized filth, which may at any time be followed by unoxidized filth. A trace of nitrates not exceeding N = 0.35 per 100,000 would not suffice to condemn a water otherwise pure.

"*Nitrites* must be considered as pointing to sewage contamination, and their presence should condemn the water. They indicate more recent and therefore more dangerous contamination than nitrates."—(*Aids to Sanitary Science.*)

7. The chief *city nuisances* are: Noise, smoke, dust, waste matters, gases and fumes, odors and various offensive trades (such as the keeping of live animals, the killing of animals, the sale of animals, the manufacture of animal products, carpet beating, smelting and chemical manufactures). About *country homes* the

nuisances which are the most in evidence are the improper disposal of waste or refuse material and the keeping of live animals.

8. To *prevent the spread of infectious diseases:* They should be reported to the health authorities; adequate isolation and quarantine (when necessary) should be enforced; proper prophylactic measures (as vaccination) should be ordered; children, from houses where there is such disease, should not be allowed to mingle with other children; proper disposal should be made of sputum and excreta; details bearing upon the prevention of each disease can be learned from special manuals on the subject.

9. (*a*) *Medicolegal complications which may arise from an erroneous diagnosis of pregnancy:* The character of the woman may be involved; the legal rights of the child may be involved; the paternity of the child and the mother's right to demand from the father support for the child are also involved; inheritance of titles and property are also to be considered.

(*b*) The practitioner should be very careful in making a diagnosis of pregnancy; he should remember that the *positive* signs of pregnancy are not present during the first few months; in doubtful cases he should maintain a strict silence, remembering that time will aid in making the diagnosis sure.

10. *Etiology of multiple neuritis:* The disease is said to be due to the action of poisons (in the blood) on the peripheral nerves. These poisons may be: Alcohol, lead, arsenic; diseased conditions as gout or syphilis; and bacterial toxins, such as are found in specific fevers, sepsis, etc.

OPHTHALMOLOGY, OTOLOGY, AND LARYNGOLOGY.

1. *Indications for iridectomy:* (1) Glaucoma; (2) some cases of chronic and recurrent iritis and iridocyclitis; (3) complete circular synechia; (4) partial corneal staphyloma; (5) tumors and foreign bodies in the iris; (6) recent prolapse of the iris. (From May's *Diseases of the Eye.*)

2. *Staphyloma* is a bulging of the cornea or sclera. It is due to inflammation.

3. *Chronic dacryocystitis* is *caused* by obstruction of the nasal duct. The *symptoms* are: Epiphora, fulness in the region of the lacrymal sac and the escape of a viscid fluid when pressure is made on the distended lacrymal sac.

4. "*Suppuration in the frontal sinus* is attended with frontal headache, vertigo, especially on stooping, and

tenderness on pressure, particularly over the internal orbital angle, or on percussion over the frontal region. Pus escapes into the middle meatus of the nose, and if wiped away will reappear if the head is bent forward for a few minutes. After removal of the anterior end of the middle turbinated bone it may be possible to catheterize the sinus and wash out pus from its interior. The diseased sinus may present a darker shadow than the healthy one on transillumination or in an *x*-ray photograph. The *treatment* consists in exposing the anterior wall of the sinus by an incision in the line of the eyebrow, chiseling away sufficient bone to admit of free removal of all infected tissue and establishing efficient drainage through the infundibulum into the nose."—(Thomson and Miles' *Manual of Surgery.*)

5. *Aphonia* is loss of voice due to some interference with the vocal cords. *Causes:* Laryngitis, edema of the glottis, retropharyngeal abscess, excessive use of the voice, tumors of the larynx, foreign bodies in larynx, inflammation of the laryngeal nerves, paralysis of the laryngeal muscles, and hysteria.

6. "*Hyperemia of the labyrinth* may result from middle ear inflammation, exanthematous diseases, mumps, some intracranial disease, cessation of menstruation, disease of the heart, excessive use of alcoholic liquors, quinine, amyl nitrite, prolonged irritation from the use of the telephone receiver and vasomotor disturbances. *Symptoms:* There is present a sense of fullness in the ear, with ringing and roaring sensations and sometimes giddiness, nausea and vomiting. The symptoms are somewhat intensified by the horizontal position."—(Kyle's *Diseases of Ear, Nose and Throat.*)

7. *Rupture of the membrana tympani* may be caused by direct violence, such as blows or by instruments introduced into the meatus; or by indirect violence, such as the sudden condensation of air in the meatus, which may be produced by an explosion or the firing of a heavy gun in the immediate neighborhood; traction on the auricle, inflammation, irritating substances, and vegetable growths may also cause rupture of the membrane. *Symptoms:* Sudden and severe pain, impaired hearing, hearing subjective noises, vertigo, a watery discharge in the meatus, a whistling sound in the ear when the patient blows his nose.

8. *Acute circumscribed otitis.*—The symptoms are a feeling of fullness in the ear, a slight itching sensation, pain in the ear with tenderness on pressure, swelling in the auditory meatus which causes stenosis and slight deafness, tinnitus, pain on mastication, and increase of

the pain and discomfort; the neighboring lymphatics may become involved, in which case there will be rise of temperature to about 100° to 101° F. There may be slight constitutional symptoms.

9. POSTNATAL ADENOIDS. *Symptoms:* Mouth breathing; snoring; open mouth; a vacant, dull expression of the face; modification of the voice (nasal twang), with inability to pronounce certain letters.

Treatment consists in early and complete removal by curette or forceps.

10. INTUBATION. *Indications.* Dyspnea from diphtheria or membranous laryngitis, stenosis, tumors, and some forms of paralysis of the larynx, and edema of the larynx.

Method: The child is wrapped in a blanket to control the arms and legs and is held upright by a nurse seated in a chair, while an assistant holds the head upon the nurse's left shoulder and prevents the mouth gag from slipping. A long piece of silk is passed through the small opening in the upper part of the tube, the tube fastened to the introducer, and the silk looped around the little finger. The left index finger is passed into the throat and lifts the epiglottis while the tube is passed along it into the glottis. The left index finger is then made to press upon the head of the tube, which is released by pulling the trigger on the introducer, which is then withdrawn. When one is assured that the tube is in the right place and that the symptoms are relieved, the silk loop may be cut and withdrawn while the finger is again made to press down on the tube.—(Stewart's *Surgery.*)

ETIOLOGY AND PHYSICAL DIAGNOSIS.

1. *Etiology of vertigo.*—Eyestrain or paresis of one or more of the muscles of the eye, disease of the semicircular canals, dyspepsia, constipation, disordered hepatic function, migraine, excesses (in the way of exercise, alcohol, tobacco, tea, coffee), organic diseases of the brain and disturbances of the cerebral circulation.

2. *Varicose ulcers of the leg are caused* by some injury to a varicose vein; the tissues are edematous, poorly nourished, and have diminished resisting power. The injury may be very slight, but the poorly nourished tissues break down and an ulcer results. Bad hygienic surroundings and neglect are predisposing factors.

3. *Etiology of rachitis.*—Improper food, want of sunlight, improper hygienic conditions; generally, insufficient food, with the diet deficient in fats and proteins;

recently, lack of mineral constituents and vitamines has been advocated as a cause of rickets.

4. *Etiology of lung abscess.*—Lobar pneumonia; lobular pneumonia; pyemia; trauma; rupture into the lung of suppuration in neighboring tissues, such as empyema, subphrenic acid, gastric ulcer, cancer of esophagus.

5. *The most probable factors in the causation of gall-stones* are: Bacteria; inflammation of gall-bladder and ducts; stagnation of bile. The predisposing factors are age, sedentary occupations, and some specific fevers, such as typhoid.

6. *The diagnosis of Graves' disease* is made by the tachycardia, exophthalmos, goiter, and intentional tremor; in addition there may be widening of the palpebral fissure and failure of the upper lid to follow the eyeball when it is rolled downward.

7. *Diagnosis of psoriasis.*—The patches are chiefly on the extensor aspect of the limbs, especially on the elbows and knees; the borders of the patches are well defined; the scales are white and adherent to the crusts; there is no inflammatory exudation; on removal of the crusts red, bleeding points are visible.

8. *In spontaneous intracerebral hemorrhage (apoplexy).*—"Usually the onset is sudden, the patient becoming unconscious and deeply cyanosed. After the irritation stage, which occurs during the bleeding, has subsided paralysis of the opposite side of the body sets in with conjugate deviation, and often hemianesthesia. The muscles of the affected side lose tone, as is shown by raising the limbs. The reflexes are lost, but return with consciousness; Babinski's sign is present. The pupils vary; they may be contracted, dilated, or unequal, in which case the larger pupil is on the affected side. Various localizing signs may be present, according to the position of the hemorrhage. The temperature is normal or subnormal. Urine and feces are passed involuntarily. The pulse is full and slow and the breathing is stertorous. A lumbar puncture yields a fluid containing blood or altered blood. Within forty-eight hours of the onset the stage of reaction sets in. The temperature rises, the sphincters become normal and the reflexes return. Early rigidity, in which the muscles resist flexion and extension, may sometimes develop."—(Woodwark's *Manual of Medicine.*)

9. Râles may be dry or moist. *Dry râles* occur in bronchitis and asthma and may be low pitched snoring sounds (sonorous râles) or high pitched whistling sounds (sibilant râles). *Moist râles* are produced by

the passage of the air through liquid and may be crepitant, subcrepitant, or gurgling in character. *Crepitant râles* are extremely fine and occur at the end of inspiration; they are heard in the first stage of pneumonia and in engorgement and edema of the lungs. *Subcrepitant râles* are comparatively few in number and are heard during inspiration and expiration, in capillary bronchitis, pulmonary edema, hypostatic pulmonary congestion and incipient phthisis. *Gurgling râles* may be large or small and are heard during inspiration and expiration in phthisical cavities, bronchial hemorrhage, in the stage of secretion in bronchitis and over the trachea.

10. *Aortic regurgitation is diagnosed by:* A diastolic murmur heard best over the aortic area; the pulse is peculiar, being the Corrigan or water hammer pulse; the heart beat is strong and the precordium may bulge; the carotid, bronchial, and femoral arteries may pulsate violently; the apex beat is displaced outward, owing to the hypertrophy of the left ventricle.

PRACTICE AND MATERIA MEDICA.

1. (*a*) Lobar pneumonia is caused by the *Micrococcus lanceolatus* (or *Diplococcus pneumoniæ*); Friedlander's pneumobacillus is often found. Predisposing causes are exposure to draughts or inclement weather, intemperance and winter weather.

Physical signs of lobar pneumonia.—"*Inspection* reveals during the first stage deficient movement of the affected side, due to pain. The apex beat is normal in situation and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air, the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration). *Palpation* during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage, the vocal fremitus is markedly exaggerated, except in those rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position. *Percussion:* In the first stage, the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas the resonance is increased (Skoda's resonance). *Auscultation:* In the first stage there is heard over the af-

fected part a feeble vesicular murmur, associated with the true vesicular or crepitant (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds, may be heard. In the third stage, the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redux) returns. As resolution proceeds the breath sounds are associated with large and small moist and bubbling râles.—(Hughes' *Practice of Medicine.*)

(*b*) There are three stages: (1) Hyperenia or engorgement; (2) red hepatization or exudation; and (3) resolution or gray hepatization.

(*c*) *Treatment.*—Consists in rest in bed, milk diet and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous and plethoric adults, with hyperpyrexia and a high tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease.—(*Pocket Cyclopedia.*)

(*d*) Serum or vaccine treatment is considered a specific by some authors.

2. (*a*) Children may suffer from lobar pneumonia, lobular or bronchopneumonia and hypostatic pneumonia.

(*b*)

LOBAR PNEUMONIA.	BRONCHOPNEUMONIA.
Generally a primary disease.	Generally secondary (to bronchitis or an infectious disease).
Age has little influence.	Generally found in very young or very old.
Sudden onset.	Gradual onset.
Fever is high and regular.	Fever is not so high, and is irregular.

LOBAR PNEUMONIA.	BRONCHOPNEUMONIA.
Ends by crisis between sixth and tenth day.	Ends by lysis, at no particular date.
Generally only one lung affected.	Generally both lungs affected.
The physical signs are distinct, and there is a large area of consolidation.	Physical signs indistinct, and the evidences of consolidation are indefinite.
Sputum is rusty.	Sputum is rather streaked with blood.

The symptoms of *hypostatic pneumonia* are those of a low grade lobar pneumonia.

For *treatment of lobar pneumonia* see question 1.

Treatment of bronchopneumonia.—Absolute rest in bed and a nutritious diet; the chest should be enveloped in a thick cotton jacket; the temperature of the room should be equable—about 65° or 70° F. If the bowels are inclined to be constipated, fractional doses (gr. 1/6) of calomel are advisable every hour until six or seven doses have been taken. In the earliest stages the tincture of aconite is of service. Its action should be *cautiously* watched, and as soon as the pulse becomes soft the drug may be omitted. Usually six or seven doses are sufficient. After the second or third day its action is too depressing and is not recommended. If the temperature rises above 102.4° F. it should be reduced by means of a cold bath. Phenacetin may be given to control the temperature, but should not be used routinely. After the third or fourth day a flaxseed poultice containing mustard (ʒ 1½) may be applied to the chest and renewed every hour. After the poultice has remained on the chest about two hours give the syrup of ipecacuanha (℥ 15) every ten minutes until emesis is produced. Both these procedures should be repeated on the following day. When the poultice is removed replace it by a cotton jacket. If the heart is weak give cardiac stimulants.—(*Pocket Cyclopedia.*)

The *treatment of hypostatic pneumonia* is that of the original condition, with the addition of stimulants (such as nitroglycerin or strychnine); their position in bed is to be frequently changed.

3. (*a*) *Hookworm disease* is a severe malady in the South, characterized by profound anemia, protruding abdomen, dropsy, weakness, lack of energy, shortness of breath, and maldevelopment.

(*b*) It is caused by the Ankylostoma duodenale or the Necator Americanus.

(*c*) The ova are voided in the feces; the latter are scattered on the ground, and the ova then come in contact with the feet and hands of the poorer inhabitants, and are then conveyed to the month.

(*d*) and (*e*) Thymol is the new remedy. *Treatment* (*Prophylactic*)—Shoes should be worn, and proper toilet facilities should be provided. Indiscriminate scattering of fecal matter is responsible for the prevalence of the disease, and the most stringent rules should be adopted to correct this unhygienic nuisance. Flies should be excluded. *Treatment* (*Active*)—On the day before the treatment is to be begun the patient is advised to eat little dinner and no supper at all. Late in the afternoon he is given a full dose of calomel (2 to 10 grains, depending upon the age and strength of the patient). If the calomel does not act freely during the night a full dose of Epsom salt in hot water should be given as soon as the patient wakes up the next morning. After the bowels have thoroughly acted, finely powdered thymol in capsule is given. The dose of thymol should be divided into two equal parts, the first half being given at once and the second at the expiration of an hour. Following the administration of the medicine the patient should be instructed to remain in bed. Harris suggests that the drug should be given in the following quantities:

Up to 5 years of age,	10 to 15 grains.
From 5 to 10 years,	15 to 30 grains.
Ten to 15 years,	30 to 60 grains.
Fifteen and over,	60 to 120 grains.

In advanced age the quantity should be somewhat less than during middle life. The patient should be allowed no breakfast and no dinner on the day of treatment, a cup of coffee once or more during the day is permissible, but nothing in the nature of food. If the patient experiences no ill effects from the thymol, it is well to put off the administration of a laxative until four or five o'clock in the afternoon, at which time some saline should be administered in hot water. After the bowels have acted well the patient may be allowed to have food. When the treatment is carried out faithfully it is rarely necessary to repeat it. It is well after a couple of weeks to again make a thorough examination of the feces, and should the microscope reveal the presence of eggs the treatment should be repeated, and this should be done over and over again until exhaustive examinations of the feces show by absence of the eggs of the parasite that all have been expelled. The public should be especially warned against patent and proprietary

medicines for hookworm disease, as they all have as a basis thymol, or some other poisonous drug, and are therefore unsafe in the hands of those unacquainted with their proper use.—(*Pocket Cyclopedia.*)

(*f*) Hookworm may simulate pernicious anemia.

4. (*a*) *Acute indigestion* is characterized by: Nausea; vomiting of undigested, or partly digested, sour-smelling matter, which later assumes a bilious character; pain and tenderness in epigastrium; anorexia; sometimes severe cramps or burning pain in abdomen; temperature normal; pulse accelerated; sometimes prostration and cold perspiration. It is to be differentiated from *Appendicitis*, in which the greatest tenderness is in the right iliac fossa, and right-rectus muscle is often rigid, and a leucocytosis may be present. *Cholelithiasis*, in which the pain is paroxysmal, and is referred to the region of the right shoulder, emaciation and jaundice may be present, and there may be a history of such attacks. *Intestinal obstruction*, in which the prostration is more marked, there is absolute obstipation, tympanites, and uncontrollable vomiting which becomes stercoraceous. *Uremia*, in which a uranalysis shows albumin, and diminished urea, and the blood pressure is high.

Treatment—Evacuate stomach and bowels; give an emetic (a hypodermic of apomorphine hydrochloride) or use a stomach tube. Then give divided doses of calomel followed by castor oil or a saline. Apply heat externally to the abdomen. The stomach must be kept at rest and no food given for from 12 to 24 hours; during this time small sips of very hot water may be allowed. Later, light diet for a few days. For the vomiting, bismuth subnitrate, or creosote, or phenol may be administered.

(*b*) *Opiates* may be administered for severe pain which is uncontrolled by the foregoing remedies; but one must be sure that the case is not one of appendicitis, intestinal obstruction, or uremia. Codeine sulphate, or morphine sulphate with atropine sulphate may be given. (*c*) By hypodermic injection.

5.

ACUTE PARENCHYMATOUS NEPHRITIS.	CHRONIC PARENCHYMATOUS NEPHRITIS	CHRONIC INTERSTITIAL NEPHRITIS.
1. Most common in children, from exposure or infectious fevers.	1. Later life; often the consequence of acute attack.	1. Late life; often results from alcoholism, gout, lead-poisoning.

ACUTE PARENCHYMATOUS NEPHRITIS.	CHRONIC PARENCHYMATOUS NEPHRITIS.	CHRONIC INTERSTITIAL NEPHRITIS.
2. Edema of lower eyelids; then of upper extremities, trunk, and, lastly, lower extremities.	2. In early stage same as acute form; later, dropsy may diminish.	2. Dropsy slight or entirely absent.
3. Urine scanty, dark or smoky color, high specific gravity, 1025 or over.	3. Urine normal or increased amount; specific gravity may fall to 1010; urine pale.	3. Urine greatly increased; specific gravity low, 1005; urine pale in color.
4. Large amount of albumin.	4. Late in attack, greatly diminished; occasionally absent.	4. Albumin greatly diminished, often absent.
5. Variety of casts, such as hyaline, blood, epithelial, and waxy casts, also free red blood globules, and epithelial cells.	5. Large and small granular casts; compound granule cells, and fatty epithelium.	5. Hyaline or finely granular casts, occasionally dark in color; infrequently blood casts and oil droplets.
6. Urea diminished.	6. Urea diminished.	6. Urea diminished.
7. Recoveries frequent.	7. Recoveries rare.	7. Indefinite duration, but never cured.

The treatment of acute nephritis consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases, pilocarpine, and by the use of warm baths, warm applications, or the vapor bath. Tincture of digitalis (♏ 5-20 every 4 hours), tincture of strophanthus, or sparteine (gr. ¼-½) may be given as diuretics. Infusion of cream of tartar and juniper berries may be employed. The occurrence of uremia will require prompt and energetic measures.

The treatment of chronic parenchymatous nephritis consists in rest, regulated diet, and the administration

of tonics. The diet should be made up of milk, vegetables, rice, and a small amount of meat, fish, and eggs. Iron, quinine, and strychnine are indicated. Constipation should be avoided by the administration of the salines. Bathing and massage are important items in the treatment. Uremia may occur in this affection.

The treatment of chronic interstitial nephritis should be directed to the cause, and in addition the diet and hygiene should receive attention. The food should be largely of milk, vegetables, and fruit. High arterial tension should be controlled by nitroglycerin and aconite. The bowels should be always kept free. Diuretics are not indicated so long as secretion is free. The recurrence of uremia will require special treatment. (*Pocket Cyclopedia.*)

6. (*a*) Whatever therapeutic value radium may possess is due to its radioactivity. It has been claimed that radium emanation is of value in all kinds of nonsuppurative arthritis (except luetic and tuberculous), in chronic muscular and joint rheumatism, in arthritis deformans, in acute and chronic gout, in neuralgia, sciatica, lumbago, and in tabes dorsalis for the relief of pain. Its chief value is in the relief of pain. In certain new growths, both benign and malignant, a favorable influence is exerted; so, too, in epithelioma, birthmarks, and scars. (From *New and Nonofficial Remedies.*)

(*b*) *Digitalis* is indicated in diseases of the heart: (1) When the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in nonvalvular cardiac affections; (4) in irritable heart, due to nerve exhaustion. Digitalis is *contraindicated* in diseases of the heart: (1) in aortic lesions when uncombined with mitral lesions; (2) when the heart action is strong, and arterial tension high. Digitalis is also a diuretic; and it is also used in some forms of nephritis, exophthalmic goiter, pneumonia, chronic bronchitis, etc. *Dangers: Overdose or constant use* will cause irregularity of the heart, headache, vomiting; and hobbling dicrotic pulse, particularly when the patient changes from the recumbent to a sitting posture.

7. *Specifics:* (1) *Mercury* is said to be specific for syphilis; it is said to exterminate the treponema; the administration of mercury should begin early in the disease and be continued for two or three years. It may be administered by intramuscular injection, by inunction, or in combination with potassium iodide.

(2) *Quinine* is specific for malaria; a ten grain dose

of sulphate of quinine should be given in the sweating stage, and again five hours before the next paroxysm is expected.

(3) *Diphtheria antitoxin* is specific for diphtheria; the prophylactic dose for children is 500 to 1,000 units, by hypodermic injection; the therapeutic dose is 2,000 to 4,000 units.

8. (*a*) To avoid salivation, give small doses of calomel, carefully watch the effect, and let the patient use a mouth-wash of a saturated solution of potassium chlorate with a little tincture of myrrh.

(*b*) The usual dose of calomel is about one grain as an alterative, or two grains as a laxative.

(*c*) Divided doses are recommended.

9. (*a*) *Castor oil* may be rendered *tasteless* by being administered in capsules; or by being floated on orange juice or strong coffee, and covered with the same vehicle.

(*b*) In typhoid, *turpentine* stupes may be placed on the abdomen, or a few drops may be given on a lump of sugar, or it may be given by enema, in emulsion.

10. The administration of quinine would differentiate typhoid from malaria. See question 7, above.

OBSTETRICS AND GYNECOLOGY.

1. (*a*) The *female internal organs of generation* are: The ovaries, Fallopian tubes, uterus, and vagina.

(*b*) *Function of ovaries:* To develop ova, and an internal secretion.

Function of Fallopian tubes: To carry ova to the uterine cavity.

Function of uterus: To receive and lodge the fecundated ovum; to retain the fetus till it is mature, then to expel it.

Function of vagina: During coitus it receives the penis; during parturition it becomes part of the birth canal; it also serves as a channel for the escape of the menstrual and other uterine secretions.

2. (*a*) *Podalic version* is that form of version in which the breech or foot of the fetus is made to present.

(*b*) *Cephalic version* is that form of version in which the head of the fetus is made to present.

3. (*a*) *Adherent placenta* is probably due to some diseased condition of the endometrium, resulting in inflammation of the decidua or placenta. The diseased condition probably antedates pregnancy. There may be partial absence of the decidua serotina, so that the chorionic villi are in direct contact with the uterine muscle.

(*b*) *Treatment of adherent placenta:* "A finger—one or two—must be insinuated between the uterus and placenta at some point already partially separated, or, if no partial separation exist, at a point where the placental border is thick, and then passed to and fro transversely through the uteroplacental junction, acting like a sort of blunt paper knife, until separation be complete. Another mode is to find or make a margin of separation as before, and then peel up the placenta with the finger-ends, rolling the separated portion toward the palm of the hand upon the surface of the still adherent part. Great care is necessary to avoid peeling up an oblique layer of uterine muscular fiber, which might split deeper and deeper until leading the finger-ends through the uterine wall into the peritoneal cavity. Should such a splitting begin, leave it alone and recommence the separation at some other point on the placental margin. It is sometimes only possible to get the placenta away in pieces. These should be afterward put together and examined to indicate what remnants are left behind. It may be quite impracticable to get out every bit, but small remnants or thin layers too firmly adherent for removal do not distend the womb enough to create hemorrhage from their bulk, and the subsequent danger of septicemia from their decomposition may be obviated by injecting warm (2 per cent.) creolin water into the uterus twice daily until everything has come away." (King's *Obstetrics.*)

4. *Symptoms of pregnancy at the fifth month:* Cessation of menstruation, quickening, mammary signs with secondary areolæ, enlarged and pigmented abdomen, intermittent uterine contractions, active fetal movements, uterine souffle, and (possibly) the fetal heart sound.

5. *Changes that take place in the female at puberty:* Development of the reproductive organs, enlargement of the breasts, hair on pubis and axilla; the form becomes rounded, the hips widen, menstruation occurs; there are certain mental and emotional changes; and "the development of those womanly beauties physiologically designed to attract the male."

6. *Severe ante partum hemorrhage* is most likely to be due to (1) accidental hemorrhage, due to premature separation of the placenta; (2) to placenta prævia.

The treatment is practically the same in each case, namely, to check the hemorrhage and promote delivery. In *accidental hemorrhage* the membranes should be ruptured and the vagina packed, or *accouchement forcé* performed; vaginal cesarean section has been employed.

In *placenta prævia:* (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about 3 inches from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the membranes, and if there is an unfavorable presentation turn the child and make the breech engage in the os; or if the head presents, forceps may be used if speedy delivery is necessary. The strength of the woman is then the main point to be cared for, and if in a reasonable time the uterus seems to be incompetent, the child may be delivered by art. In some cases of central placenta prævia, where rapid delivery is required, cesarean section may give good results for mother and child.

7. (*a*) An ovarian cyst is generally accompanied by menorrhagia or metrorrhagia, sterility, bearing-down pain in the pelvis, which may radiate to the back or thighs, hemorrhoids or constipation, frequent micturition, and various other pressure symptoms of the digestive or respiratory apparatus if the cyst becomes sufficiently large. Later on there may be the *facies ovariana*, general impairment of health, and ascites. There are no pathognomonic symptoms. The diagnosis is made by bimanual palpation and (sometimes) exploratory incision. The condition is to be particularly differentiated from pregnancy and ascites.

(*b*) The *treatment* is ovariotomy.

(*c*) No other method of treatment produces any beneficial effect.

8. An *ulcer of the cervix* presents a clear-cut border, sometimes raised and indurated, and the base of the ulcer is formed by granulation tissue; the cervix has lost some of its epithelial covering. It may be caused by irritation from pessary or discharge, chancroid infection, syphilis, tuberculosis, or malignant disease. The chief symptoms are pain, discharge, and hemorrhage. By many ulcer of the cervix is regarded as the precursor of epithelioma or carcinoma.

9. (*a*) *Menopause* is the period of a woman's life when menstrual activity ceases.

(*b*) *Metritis* is inflammation of the uterus.

(*c*) *Salpingitis* is inflammation of the oviduct, or Fallopian tube.

(*d*) *Mastitis* is inflammation of the mammary gland.

(*e*) *Menstrual cycle* is the series of changes occurring in the uterus during the interval between the commencement of one menstrual period and that of the next following.

10. (*a*) Immediately after birth the eyelids of the

newborn child should be washed with clean warm water and onto the cornea of each eye should be dropped one or two drops of a 1 or 2 per cent. solution of nitrate of silver.

(*b*) This procedure will prevent ophthalmia neonatorum in doubtful cases; it will do no harm in innocent cases; and it is the first stage in treatment if gonorrheal infection is present.

STATE BOARD EXAMINATION QUESTIONS.

LOUISIANA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. What bones form the roof of the orbit?
2. Name the carpal bones that articulate with the radius.
3. Name and bound the triangles of the neck.
4. What muscles are inserted into (*a*) the outer ridge, (*b*) the inner ridge, of the bicipital groove?
5. Name the principal branches of the external carotid.
6. How is the jugular foramen formed? What important structures pass through it?
7. Name (*a*) the sensory, (*b*) the motor, nerves of the tongue.
8. Give origin and function of spinal accessory nerve.
9. Describe briefly the blood supply of the intestines.
10. What important structures are found between the layers of the broad ligament?

PHYSIOLOGY.

1. Describe the character of contractions observed (*a*) in striated muscles, (*b*) in non-striated muscles; give examples of each.
2. Give one example of a (*a*) nitrogenous food, (*b*) carbonaceous food, (*c*) carbonitrogenous food; state what part each plays in nutrition.
3. Where, and how, are the nitrogenous foods digested?
4. Give the distribution and functions of (*a*) the hypoglossal nerve, (*b*) the spinal accessory nerve, (*c*) the superior laryngeal nerve.
5. What is the vasomotor system, and how does it influence the blood supply of the body?
6. Name the chief waste products of proteid metabolism, and state where they are formed.
7. State the functions of the (*a*) anterior nerve-roots of the spinal cord, (*b*) the posterior nerve-roots of the cord.

8. What factors are concerned in the heart sounds (*a*) in diastole, (*b*) in systole?

9. State briefly the influence on the body temperature of (*a*) muscular work, (*b*) mental work, (*c*) age, (*d*) sleep.

10. Give briefly the action of (*a*) trypsin, (*b*) lipase, (*c*) succus entericus.

CHEMISTRY.

1. What is understood by the conservation of energy, and give an example.

2. What are the special characteristics of alkaloids in general; name three alkaloids.

3. Give examples of (*a*) oxides, (*b*) hydroxides, (*c*) normal salts, (*d*) basic salts. These can be stated either in ordinary language or by formulæ.

4. Describe the contact method in testing for albumin in the urine.

5. What is the chemical composition of human milk?

6. What is ptyalin and explain its action?

7. What is hemoglobin; state some of its chief properties?

8. Give the most reliable chemical test for detecting blood.

9. What are the general properties of proteins?

10. Name two biliary pigments and by what test can they be recognized?

MATERIA MEDICA.

1. Name three emetics and give dose of each.

2. Give source and average dose of atropine.

3. How much opium is there in the following preparations: Pulvis ipecacuanhæ et opii; tincture opii camphorata.

4. Give the composition of lotio hydrargyri nigra.

5. How is nitroglycerin prepared? What precautions should be taken in handling it, and in what doses would you give it?

6. What is eserin? Give the average dose.

7. Write a prescription for a diuretic mixture.

8. Give dose properties and uses of santonin.

9. What action has ergot on the circulation; on the muscles? What is the dose of the fluid extract?

10. What is emetine? What is its dose and what is its action?

PATHOLOGY.

1. Explain the difference between secretion and excretion, giving example of each.

2. Give the difference between exudate and transudate, with an example of each.

3. Pus is the result of what?

4. Define atrophy. Give the varieties of atrophy.
5. What is an embolus; how formed, and state some of the sequels of embolism.
6. Give the pathology in gonorrheal arthritis.
7. What is the difference between stock vaccine and autogenous vaccine?
8. Describe the *Amœba coli*, and give method most used in the examination for the *Amœba coli*.
9. Describe a Paget's cancer, and where most found?
10. Describe a Charcot's joint.

THEORY AND PRACTICE OF MEDICINE.

1. Name five reflexes, and describe the manner of eliciting them.
2. State the symptoms, diagnosis, and treatment of amebic dysentery.
3. (*a*) What is the import of hematuria? (*b*) What conditions may give rise to it?
4. State the diagnostic value of a blood count.
5. Treat a case of endocarditis complicating rheumatic fever.
6. Differentiate acute morphinism, acute alcoholism, and apoplexy.
7. Treat a case of pernicious malaria.
8. Outline briefly the dietetic management of a case of chronic nephritis.
9. State the diagnosis and treatment of impetigo contagiosa.
10. (*a*) Describe locomotor ataxia; (*b*) state briefly the symptoms and physical signs in the initial and ataxic stages.

OBSTETRICS.

1. Name and describe the signs of pregnancy as determined by touch.
2. State the diagnosis and treatment of an inevitable abortion.
3. Diagnose by abdominal palpation and vaginal touch an R. O. P. presentation.
4. (*a*) What is the second stage of labor? (*b*) What conditions may cause delay in this stage? (*c*) How should such conditions be managed?
5. A primipara at the fourth month of pregnancy presents evidences of albuminuria, with no uremic manifestations; what treatment is indicated?
6. Should delivery become imperative, the head being only partially engaged, and the cervix partially dilated, how is delivery best effected?
7. (*a*) What is prolapse of the funis? (*b*) What the dangers? (*c*) Management?
8. (*a*) What conditions would necessitate artificial

feeding? (*b*) Describe the proper modification of cow's milk for the newly born.

9. (*a*) What drugs are of use in labor? (*b*) State their indications and contraindications.

10. (*a*) State the maternal and fetal indications for the use of forceps. (*b*) What are the prerequisites necessary for their safe application?

GYNECOLOGY.

1. Mention the changes of cervix uteri which may be felt on vaginal examination.

2. Give differential diagnosis of syphilitic, tuberculous, and malignant ulcer appearing about the external genitals.

3. Give the principal points of diagnostic importance in connection with an abdominal examination.

4. A patient presenting herself for examination with a mass in right lower abdomen—what might it be?

5. Give special symptoms pointing to tubal pregnancy.

6. Of what use is the uterine sound?

7. What symptoms may follow retroversion of the uterus?

8. Name the causes of dysmenorrhea.

9. Why is gonorrhea in women a grave disease?

10. What is a urethral caruncle, and its treatment?

SURGERY.

1. Describe briefly the technique you would employ for a punctured wound of the foot caused by a pitchfork.

2. Give symptoms and treatment of acute catarrhal otitis media.

3. Differentiate between trachoma and conjunctivitis.

4. What is a carbuncle? How would you treat one?

5. Differentiate between typhoid fever and appendicitis.

6. What arteries need ligating in an amputation at the middle third of the leg?

7. What part of the vertebræ is usually affected in Pott's disease. Describe the pathological changes that take place.

8. Give diagnosis and treatment of acute osteomyelitis.

9. Name some of the bacteria of suppuration. Which ones are the most virulent?

10. Make a differential diagnosis between coma due to (*a*) injury, (*b*) apoplexy, (*c*) opium poisoning, (*d*) acute alcoholism.

LOUISIANA.

PHYSICAL DIAGNOSIS.

1. Name the various abnormal respiratory sounds (râles), and indicate the physical conditions giving rise to each.
2. Differentiate pulmonary hepatization and pleurisy with effusion.
3. Differentiate impacted stone in the right ureter from other similar conditions.
4. What are the physical signs of pyloric stenosis?
5. What are the early symptoms and physical signs in pulmonary tuberculosis?

HYGIENE.

1. Name and describe briefly the methods of purification of public water supply.
2. (*a*) What is natural immunity? (*b*) Acquired immunity? Explain each.
3. Describe the disinfection of a room occupied by a careless consumptive.
4. State briefly the sanitary supervision necessary for the production of pure milk.
5. How are mortality rates calculated?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

LOUISIANA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. *Bones forming the roof of the orbit:* Frontal and sphenoid.
2. *Carpal bones that articulate with the radius:* Scaphoid and semilunar.
3. The ANTERIOR TRIANGLE OF THE NECK is *bounded:* In *front* by a line from the chin to the sternum; *behind* by the anterior margin of the sternomastoid; *base* is upward, and is formed by the lower border of the body of the lower jaw and a line from the angle of the jaw to the mastoid process. It is *divided* into three smaller triangles (inferior carotid, superior carotid, and submaxillary) by the digastric muscle and the anterior belly of the omohyoid. The *inferior carotid triangle* is bounded, *in front* by the median line of the neck; *behind*, by the anterior margin of the sternomastoid; and *above*, by the anterior belly of the omohyoid. The *superior carotid triangle* is bounded, *behind* by the sternomastoid; *below* by the anterior belly of the omohyoid; and *above* by the posterior belly of the digas-

tric. The *submaxillary triangle* is bounded, *above* by the lower border of the body of the mandible and a line drawn from its angle to the mastoid process; *below*, by the posterior belly of the digastric and the stylohyoid; and *in front*, by the anterior belly of the digastric.

The POSTERIOR TRIANGLE OF THE NECK is *bounded:* In *front* by the sternomastoid; *behind*, by the anterior margin of the trapezius: and its *base* corresponds to the middle third of the clavicle. It is *divided* into two smaller triangles (the occipital and the subclavian) by the posterior belly of the omohyoid. The *occipital triangle* is bounded in *front*, by the sternomastoid; *behind*, by the trapezius; and *below*, by the omohyoid. The *subclavian triangle* is bounded *above*, by the posterior belly of the omohyoid; *below*, by the clavicle; and *in front*, by the sternomastoid.

4. To the outer bicipital ridge is attached the Pectoralis major; to the inner bicipital ridge is attached the Teres major.

5. *Branches of the external carotid artery:* Superior thyroid, lingual, facial, occipital, posterior auricular, ascending pharyngeal, superficial temporal, and internal maxillary.

6. The *jugular foramen* is formed by the temporal bone in front and externally, and the occipital bone behind and internally; it *transmits:* The inferior petrosal sinus, lateral sinus, meningeal branches of occipital and ascending pharyngeal arteries, and the glossopharyngeal, vagus, and spinal accessory nerves.

7. TONGUE. *Sensory nerves:* Lingual branch of the inferior maxillary division of the trigeminal (ordinary sensation to anterior two-thirds), chorda tympani (nerve of taste for anterior two-thirds), glosso-pharyngeal (general sensation and taste to posterior third). *Motor nerve:* Hypoglossal.

8. SPINAL ACCESSORY NERVE. *Superficial origin:* From the lateral tract, inferior to the pneumogastric; and from the side of the spinal cord as far down as the sixth cervical nerve. *Deep origin:* From the anterior horn of gray matter of the medulla, and of the spinal cord as far down as the fifth cervical nerve. *Function:* Motor nerve to the sternomastoid and trapezius muscles.

9. BLOOD SUPPLY OF THE INTESTINES. *Duodenum:* Pyloric and pancreatico-duodenal (of the hepatic), and inferior pancreatico-duodenal (of superior mesenteric). *Jejunum and ilcum:* Branches of the superior mesenteric artery. *Cecum and appendix:* Ileocolic and appendicular arteries. *Colon:* Right colic and middle

colic (of superior mesenteric), left colic and sigmoid branches (of inferior mesenteric). *Rectum:* Superior hemorrhoidal (of inferior mesenteric), middle hemorrhoidal (from internal iliac), and inferior hemorrhoidal (from internal pudic artery).

10. *Structures between the layers of the broad ligament:* Fallopian tube, round ligament, ovary, ovarian ligament, parovarium, loose connective tissue, vessels and nerves.

PHYSIOLOGY.

1. *During contraction*, the following changes take place in a voluntary (striated) muscle: (1) It becomes shorter and thicker, but (2) there is no change in volume; (3) there is an increased consumption of oxygen; (4) more carbon dioxide is set free; (5) sarcolactic acid is produced; and hence (6) the muscle becomes acid in reaction; (7) it becomes more extensible, and (8) less elastic; (9) there is an increase in heat production and consequently a rise of temperature; (10) the electrical reaction becomes relatively negative, and (11) a sound is produced. Further, a single stimulus produces a simple contraction; a series of rapid stimuli produces a condition of tetanus, but of an incomplete kind. Involuntary (non-striated) muscle acts differently: The duration of the contraction is prolonged; there is a tendency to rhythmical contraction; peristalsis is also a characteristic of this class of muscle; involuntary muscle cannot be thrown into tetanus. *Voluntary muscle* is found in all the skeletal muscles, pharynx, diaphragm, larynx, external ear, and eye. *Involuntary muscle* is found in the alimentary tract from the middle third of the esophagus to the anus, in the ducts of glands, in the trachea and bronchial tubes, within the eyeball, the internal urinary and genital systems, circulatory (except the heart) and lymphatic systems, and the capsules of some organs.

2. A *nitrogenous* food, peas; a *carbonaceous* food, sugar; a *carbonitrogenous* food, sweetbread.

FOOD.	FUNCTIONS.
Proteids.	
1. All substances containing nitrogen, of a composition identical with, or nearly that of albumin; proportion of N to C being nearly as 2 to 7.	Formation and repair of tissues and fluids of the body. Regulation of the absorption and utilization of oxygen. May also form fat and carbohydrate, and yield energy sometimes.

FOOD.	FUNCTIONS.
2. Substances containing a larger proportion of N are apparently less nutritious; proportion of N to C about 2 to 5½.	These perform the above functions less perfectly, or only under particular circumstances.
3. Extractive matters, such as are contained in the juice of the flesh.	These substances appear essentially as regulators of digestion and assimilation, especially with reference to the gelatin group.
Carbohydrates. Substances containing no N, but made up of C, H and O; the O being exactly sufficient to convert all the H into H_2O.	Production of energy and animal heat by oxidation. Form fats and possibly some proteids.

3. Nitrogenous foods are digested: (1) In the stomach where the pepsin, in the presence of dilute hydrochloric acid, causes hydrolysis of the protein molecule, splitting it up into smaller and more soluble molecules. The stages of gastric digestion are from protein to globulin, to metaprotein, proteoses and peptones. (2) In the intestine, where the trypsin of the pancreatic juice, in a slightly alkaline medium, performs a somewhat similar function as the pepsin of the gastric juice; only, here, the process is continued further, and the proteoses and peptones are further broken up into polypeptides and amino-acids.

4. The HYPOGLOSSAL NERVE is *distributed* to the muscles of the tongue, to the thyrohyoid, and to the omohyoid, sternohyoid and sternothyroid muscles. *Function:* Motor to the tongue. SPINAL ACCESSORY NERVE. *Distribution:* After emerging from the cranial cavity the nerve soon separates into two branches: (1) An *internal* or *anastomotic* branch, consisting chiefly of filaments coming from the medulla oblongata. It soon enters the trunk of the vagus, from which fibers pass to the muscles of the pharynx, to the muscles of the larynx through the inferior laryngeal nerve, and to the heart according to most authorities. (2) An *external* branch, consisting chiefly of the accessory fibers from the spinal cord. It is distributed to the sternocleidomastoid and trapezius muscles.

Function: The transmission of nerve impulses from

the cells from which they take their origin to the muscles to which they are distributed. They therefore excite to action some of the muscles of deglutition, the muscles which regulate the tension of the vocal bands during phonation, and the muscles which control the respiratory movements associated with sustained or prolonged muscle efforts; the fibers also convey nerve impulses which exert an inhibitory influence on the heart; it is the motor nerve to the trapezius and sternomastoid. (From Brubaker's *Physiology.*)

SUPERIOR LARYNGEAL NERVE. *Distribution:* Larynx, cricothyroid muscle. *Function:* Sensory to the larynx, and motor to the cricothyroid muscle.

5. The vasomotor nervous system consists of (1) a vasomotor center in the bulb, (2) of some subsidiary centers in the spinal cord, and (3) of vasomotor nerves, which are of two kinds: (*a*) those causing constriction of the vessels, and so-called vasoconstrictor nerves; and (*b*) those causing dilatation of the vessels, and so-called vasodilator nerves. These nerves supply the muscle tissue in the walls of the blood-vessels and regulate their caliber, thus influencing the *quantity* of blood supplied to a part; at the same time they regulate the *quality* of blood supplied to a part; they also regulate the *nutrition* of a part, also *secretion* and *heat production.* They are concerned, too, in the control of the heart-beat. The center is in the medulla, in the floor of the fourth ventricle, near the calamus scriptorius.

6. *The chief waste products of proteid metabolism are:* Urea, ammonia, creatin, creatinin, hippuric acid, sulphates, various purin bases (chiefly uric acid).

Most of the *urea* is formed in the liver, from (1) the amino acids which have been absorbed from the small intestine, and which are not needed by the body; and (2) from the ammonium carbonate which is derived from the tissues, and from the action of a uricolytic enzyme upon uric acid. These two sources give respectively what is known as *exogenous* urea and *endogenous* urea.

Uric acid: "In man uric acid has a twofold origin; one portion, coming from the breaking down of the nuclein-containing tissues or cell elements of the man's own body, and hence is of endogenous origin, while the other portion—usually the larger—is of exogenous origin, coming from the transformation of free and combined purin compounds present in the food."—(Chittenden.)

Hippuric acid has its origin in the kidney; and creatin and creatinin in muscle and other tissues.

7. The anterior nerve roots of the spinal cord are *motor;* the posterior nerve roots are *sensory.*

8. The *causes* producing the *first* sound of the heart are not definitely ascertained. The following are supposed to be causatory factors: (1) The vibration and closure of the auriculo-ventricular valves, (2) the muscular sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall.

The *second* sound is caused by the vibration due to the closure of the semilunar valves.

The first sound is synchronous with the ventricular systole; and the second sound with the first part of the ventricular diastole.

9. *Muscular work* increases the body temperature; *mental work* slightly increases the body temperature; *age* exerts a slight influence, as the temperature of the child is generally a little higher than that of the adult; and the temperature of an old person is a little lower than that of the adult; *sleep* diminishes the body temperature by lessening the production of heat.

10. *Trypsin* converts proteins into proteoses, peptones, polypeptides, and amino-acids, in an alkaline medium.

Lipase splits fats into glycerol and fatty acids.

Succus entericus converts starch into dextrin and then into dextrose and levulose; it also splits polypeptides into amino-acids and ammonium compounds; it converts sugars into dextrose, levulose, and galactose.

CHEMISTRY.

1. *Conservation of energy.* When one form of energy disappears, an exact equivalent of another form of energy takes its place. Thus heat may be converted into motion, and motion into chemical energy; but in each case there is exactly the same amount of energy present.

2. *Alkaloids* are nitrogenous, basic substances, of alkaline reaction, and capable of uniting with acids to form salts in the same way that ammonia does. Most alkaloids are solid, crystalline, contain carbon, hydrogen, nitrogen, and oxygen, are sparingly soluble in water, but are soluble in alcohol, their salts are freely soluble in water, they are generally bitter in taste. *Three alkaloids:* Morphine, atropine, quinine.

3. *Oxides:* Sulphur dioxide, SO_2; ethyl oxide $(C_2H_5)_2O$.

Hydroxides: Potassium hydroxide, KOH; ethyl hydroxide, C_2H_5OH.

Normal salts: Dipotassic sulphate, K_2SO_4; calcium carbonate, $CaCO_3$.

Basic salts: Lead carbonate (of the pharmacopœia), $(PbCO_3)_2 PbH_2O_2$; so-called, bismuth subnitrate, $BiONO_3$.

4. *The contact method in testing for albumin in the urine:* Put a small amount of nitric acid into a test-tube; fill a pipette with the filtered urine; hold the test-tube at a small angle to the horizontal and allow the urine to flow slowly from the pipette upon the surface of the nitric acid. Remove the pipette, and gently turn the test-tube into the vertical position; a milky zone at the junction of the nitric acid and urine denotes the presence of albumin.

5. *Human milk* is composed of almost 87 per cent. of water and 13 per cent. of solids. The latter are: Fat, about 3.5 per cent.; milk sugar, about 6 per cent.; protein about 4 per cent.

6. *Ptyalin* is an enzyme found in the saliva. Its action is to turn starches into maltose. It acts only in an alkaline medium, and acts best at about the body temperature; it is necessary to remove the products of its activity.

7. *Hemoglobin* is a proteid coloring matter containing iron, and is present in the red blood corpuscles. It is of very complex constitution; it readily absorbs oxygen from the air, and forms oxyhemoglobin; it is the oxygen-carrying part of the blood, conveying the oxygen from the lungs to the various tissues of the body; it gives a characteristic spectrum band.

8. *The best chemical test for blood,* is the formation of hemin crystals. These crystals are obtained by boiling a fragment of dried blood with a drop of glacial acetic acid on a slide; the characteristic crystals may be seen with the microscope.

9. Proteins are very complex organic compounds, consisting of carbon, hydrogen, oxygen, nitrogen, sulphur, and other elements. They are split up by pepsin and trypsin into proteoses, peptones, polypeptids and amino acids; they are insoluble in alcohol and ether, most of them are insoluble in water, but some are capable of entering into a state of colloidal solution; they are soluble in the gastric and pancreatic juices. Most of them are coagulated by heat; they are colloids, are levorotatory, and give many color reactions.

10. *Two biliary pigments:* Bilirubin and biliverdin. *Gmelin's test for bile pigments* consists of a play of colors—green, blue, red, and yellow—produced by the action of fuming nitric acid.

MATERIA MEDICA.

1. *Three emetics:* Apomorphine hydrochloride, dose

1/10 grain used hypodermatically. Copper sulphate, dose gr. iv. Zinc sulphate, dose gr. xv.

2. *Atropine* is an alkaloid of *Atropa Belladonna;* the average dose is 1/160 grain.

3. *Pulvis ipecacuanhæ et opii* contains 10 per cent. of opium; *Tinctura opii camphorata* contains about one grain of opium to the half ounce.

4. *Lotio hydrargyri nigra* contains thirty grains of calomel to ten ounces of lime water.

5. *Nitroglycerin* is prepared by the action of a mixture of nitric and sulphuric acids upon glycerin. The spirit of nitroglycerin is given in doses of one minim. It should be kept in well-stoppered tin cans, in a cool place, away from lights and fires, and should be very carefully handled because, if a considerable quantity of it is spilled a violent explosion may occur.

6. *Eserine* is an alkaloid of physostigma. The dose of the salicylate and sulphate is 1/64 grain.

7. *Prescription for a diuretic mixture:*

℞.

Potassii acetatis.
Potassii bitartratis.
Potassii citratis aa ʒij.
Aquæ q.s. ad ʒviij M.

Sig.:—Take one tablespoonful, well diluted, three times a day.

8. *Santonin* is obtained from Santonica, which is derived from *Artemisia pauciflora;* it is used as an anthelmintic to round worm and thread worm; dose, for a child, gr. ¼-½; for an adult, gr. j or ij.

9. *Ergot* stimulates and causes contraction of involuntary muscle fibers, hence it is vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative; it raises the blood pressure, it increases peristalsis, and is an emmenagogue. The dose of the fluid extract is thirty minims.

10. *Emetine* is an alkaloid of *Cephaelis Ipecacuanha;* it is used as an expectorant and an emetic; the dose (as an expectorant) is 1/100 grain; (as an emetic), 1/6 grain.

PATHOLOGY.

1. A *secretion* is a liquid or semi-liquid product formed by glandular organs; as saliva.

An *excretion* is a product which is eliminated from a gland (or other structure); as urine.

Formerly, it was held that a secretion had some further use in the body; and that an excretion had no use, but that its further retention was dangerous.

Basic salts: Lead carbonate (of the pharmacopœia), $(PbCO_3)_2$ PbH_2O_2; so-called, bismuth subnitrate, $BiONO_3$.

4. *The contact method in testing for albumin in the urine:* Put a small amount of nitric acid into a test-tube; fill a pipette with the filtered urine; hold the test-tube at a small angle to the horizontal and allow the urine to flow slowly from the pipette upon the surface of the nitric acid. Remove the pipette, and gently turn the test-tube into the vertical position; a milky zone at the junction of the nitric acid and urine denotes the presence of albumin.

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MATERIA MEDICA.

1. *Three emetics:* Apomorphine hydrochloride, dose

amine for the *Amœba coli*, the stool should be passed in a warm vessel, and kept warm till the examination is complete; a warm stage should be used.

9. *Paget's disease* is an eczematous inflammation of the nipple and areola, with a tendency to ulceration; it is, in very many cases, the starting point of a carcinoma. It has been asserted that the condition is due to the presence of coccidia, but this has not been proved. The nipple may be retracted, there is a moist desquamation, followed by a sticky discharge and formation of crusts; under the latter, the surface is raw and red. In some cases the nipple may be completely destroyed.

10. "*Charcot's joint* is a joint affection observed in posterior sclerosis, syringomyelia, poliomyelitis, transverse myelitis and a few other forms of spinal disease. The joints usually affected are the knee, hip, shoulder, elbow, hand, foot, and more rarely the fingers. The disease is rather rapid and is quite destructive, thickenings and ulcerations forming upon the synovial membrane and ligaments. Serous exudates and inflammations of the peri-articular tissues occur, and spontaneous luxation is not infrequent. The cause of the affection is supposed to be atrophic neurosis. In general, the pathologic changes resemble those of arthritis deformans." (McFarland's *Pathology*.)

THEORY AND PRACTICE OF MEDICINE.

1. FIVE REFLEXES. *Plantar:* elicited by stroking or scratching the sole of the foot, when the patient attempts to withdraw the foot. *Tendo Achillis reflex:* when the leg is extended and supported at the knee, and the hand is pressed firmly against the ball of the foot, a tap on the tendo Achillis causes contraction of the gastrocnemius and soleus, and the heel is jerked up. *Patellar reflex:* when the thigh is supported by being crossed over the other thigh, and the leg is flexed at the knee, a tap on the quadriceps tendon just below the patella causes the leg to be suddenly extended *Ankle clonus:* if the half-extended leg be supported at the knee, and the ball of the foot be suddenly pressed up, putting the tendo Achillis on the stretch, there sometimes results a series of contractions of the muscles of the calf with alternate extension and flexion of the foot, which continues so long as pressure is maintained on the ball of the foot and ceases when the pressure is released. *Cremasteric:* when the inner surface of the thigh is irritated, the testicle on the same side is retracted.

2. AMEBIC DYSENTERY. *Symptoms:* It is usually

ushered in by an attack of diarrhea, accompanied by slight fever, nausea, and vomiting. There are intense abdominal pain and a constant desire to go to stool. The stools become more frequent and bloody. Tenesmus is worse in the afternoon and at night. Temperature may be normal or slightly elevated (100° F.). Intermissions occur in the disease, and the *Amœba coli* is found in the stools. The *diagnosis* is made by finding the microorganisms in the stools, in conjunction with the symptoms.

The treatment consists of rest in bed and liquid diet. Laudanum (30 drops), followed in half hour by ipecac, gr. 30, repeated, if necessary, has been recommended for internal administration. Rectal irrigations of plain water, silver nitrate solution (gr. 20-30 to the quart) creolin (4 drams to the quart), or quinine (1:5000 to 1:1000) constitute the best treatment. Pain is relieved by opium. Emetine hydrochloride, given subcutaneously or intravenously, is also recommended.

3. *Hematuria* means the presence of blood in the urine; when blood-pigment only (not corpuscles) is found in the urine the condition is called *hemoglobinuria.*

The *principal causes of hematuria* are: (1) Conditions in which the blood is affected, as in the infectious diseases, in scurvy, pernicious anemia, and purpura; (2) traumatism or inflammations in any part of the urinary tract; (3) congestion of the kidneys secondary to disease of the lungs, heart, or liver.

4. A *blood count* will settle the diagnosis of a pernicious and secondary anemia, leukemia (lymphatic and splenomedullary). Further, a leucocytosis is generally present in lobar pneumonia, pericarditis, empyema, acute rheumatism, erysipelas, cerebrospinal meningitis, typhus, relapsing fever, Asiatic cholera, bubonic plague, yellow fever, tonsillitis, appendicitis, septicemia, pyemia, and other inflammatory conditions. A leucopenia is found in typhoid, malaria, influenza, measles, pernicious anemia.

5. In *endocarditis complicating rheumatic fever*, the patient needs absolute rest in bed for a long period of time; care must be taken in the use of salicylates, as these tend to depress the heart; digitalis is indicated if the heart is failing, but care must be taken not to overstimulate the heart; light diet, milk, attention to the bowels, and sleep are of prime importance.

6. The following table is from Eisendrath's *Surgical Diagnosis:*

APOPLECTIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Deep coma; sudden onset. If any injury, only a scalp wound.	Can be aroused by supraorbital pressure unless very profound.	Can be aroused unless very deep.
Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse full and slow, often arteriosclerotic high - tension pulse.	Pulse more rapid than normal, and full.	Pulse rapid, may be irregular.
Respiration slow and irregular.	Regular respiration.	Respiration very slow—may be 6 to 8 per minute.
Temperature higher on paralyzed side, but lower in rectum.	May be low or normal.	
Urine contains trace of albumin, but may be same as in uremia.	Normal.	Normal.
Hemiplegia with convulsions on one side.		

7. *Treatment of pernicious malaria:* The patient should be promptly cinchonized by the hypodermic injection of bisulphide or bihydrochloride of quinine (about 30 grains); or the muriate of quinine and urea in 15 or 20 grain doses may be similarly employed; intramuscular injection is said to be less painful than subcutaneous injection; methylene blue, in doses of 3 grains, in capsules or pills, has been recommended; Warburg's tincture, either with or without aloes, may

be used; in the cold stage, heat may be applied to the body surface, and in the hot stage cold may be applied, and morphine administered hypodermically.

8. *In chronic parenchymatous nephritis*, the *diet* is important. "An exclusive milk diet is impracticable, even harmful. The cereals, with fruits and the lighter vegetables are all permissible. Meats in small quantity are allowable, either light or dark. The water intake must not be regulated by any hard-and-fast rule, but it should be proportioned to the freedom of diuresis. If there is marked edema, especially if it be on the increase, attempted flushing of the kidney is provocative of harm. Under these circumstances water is among the most difficult substances for the kidney to excrete. If the edema is slight or subsiding rapidly larger quantities of fluid are not only permissible but advisable. The intake of salt should be limited to the minimum, as it is pretty generally conceded that its presence in the diet aids the development of edema." (Williamson's *Practice of Medicine.*)

9. In *impetigo contagiosa*, the eruption appears with the greatest frequency on the face and hands and often follows some very trivial injury, as a scratch. As the lesions appear, their contents are clear, but within a day or so the vesicle or bleb character is lost and they assume all the features of pustules. The pustules rapidly dry, forming crusts which have a "stuck on" appearance. After several days these drop off, leaving a slightly red area beneath. Usually there are present at the same time several lesions in various stages of development. The vesicopustules may coalesce, forming several large blebs, or they may arrange themselves in half-circles. Itching is very slight or absent. Neglect or improper treatment may cause the development of an eczema or an impetiginous area. The duration of the disease is in most instances from ten days to two weeks. *Treatment:* The crusts should be removed by means of some nonirritating soap and water, after which an ointment containing ammoniated mercury and the red oxide of mercury may be applied. Other mild antiseptics, such as boric acid, sulphur, etc., may be employed, care being taken to reduce the strength sufficiently to avoid irritation." (Hughes' *Practice of Medicine.*)

10. *Locomotor ataxia* is a disease of the spinal cord, characterized by loss of coordination, characteristic and unsteady gait, a tendency to stagger when standing up with the feet together and the eyes closed, sharp and paroxysmal pains called *crises*, girdle sensation, Argyll-Robertson pupils, and loss of knee-jerk and other re-

flexes. In locomotor ataxia the posterior columns of the spinal cord and the posterior nerve roots are involved. The process is destructive and progressive; it is not a simple wasting, although the nerve fibers are atrophied, but it is characterized by irritation, changes in the axis cylinders, overgrowth of the connective tissue, and sometimes congestion. The spinal ganglia may also be affected and the membranes over the affected parts are adherent and opaque.

In the *pre-ataxic stage*, there may be found: Lightning pains, girdle pains, paresthesia, loss of knee-jerk, Argyll-Robertson pupil, ptosis, and optic atrophy. In the *atoxic stage*, there will be found: Incoordination, the ataxic gait, flaccidity of the muscles, loss of muscle sense, various visceral crises, perforating ulcer of foot, brittleness of bones, and Charcot's disease.

OBSTETRICS.

1. *Signs of pregnancy as determined by touch:*

(*a*) *Ballottement* is the passive movement of the fetus *in utero*, obtained by tapping the lower segment of the uterus with the index finger.

(*b*) *Hegar's sign* consists in a thinning and softening of a segment of the body of the uterus immediately above its cervix.

(*c*) *Braxton Hicks' sign* consists of intermittent contractions of the uterus, at about the fourth month of pregnancy.

(*d*) *Rasch's sign* is fluctuation felt when the hand is applied to the cervix of the uterus in early pregnancy, due to the presence of liquor amnii.

(*e*) Active movements of the fetus, which can be felt by the physician's hand placed over the abdomen of the mother.

2. INEVITABLE ABORTION. (*a*) *Diagnosis:* Hemorrhage profuse and continuous, clotted and dark colored; pain cramp-like and severe; cervical canal dilated; uterus soft and enlarged, and the angle between the upper and lower uterine segments is effaced; the discharge consists of dark blood, clots, and portions of ovum; signs of pregnancy present, except amenorrhea.

(*b*) *Management:* "Two methods of treatment have been advised for these cases. The first is *the expectant plan*. Place the patient in bed, and if the bleeding is profuse, insert a tampon of iodoform gauze (one yard) well up against the cervix. If this fails to control the hemorrhage, reinforce it by another yard or two of gauze and a perineal pad and binder. Small doses (3½) of the fluidextract of ergot should now be given

every two or three hours. At the end of from eight to twelve hours remove the tampon, when the ovum may be found extruded from the cervix; if not, a vaginal douche of mercuric chloride (1:4000) must be given, and another tampon introduced. If, upon the removal of this second tampon at the end of ten or twelve hours, the ovum is not discharged, then more vigorous methods to secure its expulsion must be adopted. *Active plan:* The physician's hands and instruments are sterilized; the patient is etherized and placed on an appropriate table; the genitalia are thoroughly cleansed and a vaginal douche of mercuric chloride (1:4000) is given; the anterior lip of the cervix is brought down to the vulvar orifice; the cervix is dilated if necessary; the placental forceps is introduced into the uterus, and as much as possible of the ovum is removed; the uterus is thoroughly curetted, and an intrauterine douche of sterile water is given. A light tampon of iodoform gauze is placed in the vagina; the patient is then returned to bed. A strip of gauze may be placed in the uterus in cases of sharp retroflexion, to secure free drainage, and occasionally an intrauterine tampon will be necessary when the uterus refuses to contract and hemorrhage persists after the use of the curette."—(*Pocket Cyclopedia.*)

3. *In R. O. P. positions, abdominal palpation* shows that the back of the fetus lies to the right side and posteriorly, and that the extremities are above and to the left side and anteriorly. *Vaginal examination* shows that the occiput is depressed and points to the right sacroiliac synchondrosis; the smaller fontanel is also posterior and points to the right sacroiliac synchondrosis. The sagittal suture is directed from the small fontanel forward and to the left in the line of the right oblique diameter of the pelvis; the shoulders are in a line at right angles to this, in the left oblique diameter. Sometimes the anterior fontanel may be felt high up anteriorly.

4. The *second stage of labor* extends from the time that the os is fully dilated until the child is expelled from the uterus.

DELAYED LABOR. *Causes:* Obstruction, uterine inertia, uterine exhaustion. *Management:* The case should be treated early; causes should be removed when possible; a warm vaginal douche, and the administration of morphine, chloral, or quinine have been recommended; delivery by forceps may be necessary.

5. *Albuminuria with no uremic manifestations:* "The urine should be examined every month in the first six

months of every pregnancy, no matter how normal it may seem, and every fortnight in the last three months. If albumin is present, the amount should be estimated in an Esbach tube, and the urea in a Doremus ureometer. The total quantity of urine per diem should also be ascertained. The principles of treatment are to relieve the kidneys by free elimination by the bowels and skin, and by diminishing the nitrogenous part of the dietary; and at the same time to prevent any further interference with the renal functions by guarding against cold. In mild cases where the albuminuria is the sole symptom, the patient should be warned to rest and guard against cold. The diet should be restricted to milk food, with bread and butter, and a little fish or chicken once a day, and the bowels should be made to act freely once every day. (Johnstone's *Textbook of Midwifery.*)

6. *If the internal os is persistent,* dilating bags may be tried; if these are not at hand, or not effective rapidly enough, cesarean section offers the safest method of delivery, though it usually entails some delay for preparations unless the likelihood has been anticipated. *If the internal os is obliterated,* manual dilatation is indicated, following this by forceps if the head engages, or by version if the head does not engage; or dilating bags may be used, followed by forceps or version; or the cervix may be incised, and the child delivered by forceps or version. If the patient is a primipara, forceps should be favored if possible on account of the better prognosis for the child and the lesser liability to serious traumatism of the mother's soft parts.

7. *Prolapse of the funis* is the condition in which the umbilical cord hangs down alongside of or in front of the presenting part of the fetus. *Danger:* Compression causes death of the fetus. *Treatment of prolapsed funis* consists in: (1) Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor; (4) speedy delivery, by forceps or podalic version.

8. *Artificial feeding is indicated:* If the mother dies; if there is absence of breast milk, eclampsia, tuberculosis, septic infection, severe hemorrhage, or chorea on the part of the mother; and in case of persistent loss of weight of the child.

Proper modification of cow's milk includes dilution, and the addition of cream and sugar of milk.

For a newborn infant, take the top 9 ounces from a quart of good milk, of this use 2½ ounces; to this 2½ ounces add one ounce of milk sugar and 17½ ounces of boiled water. This will give 20 ounces. The infant should receive about half an ounce every two hours for the first day, and about one ounce every two hours for the next six days. During the night the infant should be fed twice. This mixture is only suitable for the first week.

9. DRUGS USED IN LABOR. Bichloride of mercury, lysol, phenol, creolin, etc., are *indicated* as antiseptics for the vulva, and hands of physician and nurse. Boric acid and silver nitrate, are *indicated* for use in the infant's eyes, to prevent ophthalmia. Quinine, and strychinine are *indicated* in primary and secondary uterine inertia, but are contraindicated in eclampsia. Morphine is *indicated* early in labor in case of weak and inefficient pains and rigid os; if given later there is danger of fetal asphyxia. Chloral is *indicated* for the same conditions as quinine, strychnine and morphine. Veratrum viride is *indicated* in eclampsia and vascular hypertension; it is *contraindicated* in cases with slow and soft pulse. Chloroform and ether are *indicated* in the latter part of the second stage of labor to alleviate the suffering, and also in all obstetrical operations; chloroform is *contraindicated* in cases of very rapid fetal heart, and where the mother has cardiac disease; ether is *contraindicated* in cases of bronchiectasis, tuberculosis and eclampsia. Ergot is *indicated* in postpartum hemorrhage; it is given during the third stage to ensure good contractions of the uterus; it should *not be given* before the third stage of labor. Pituitrin is given for postpartum hemorrrhage, secondary inertia, and induction of premature labor; it is *contraindicated* if the os is undilated, and must be used cautiously if the soft parts are not prepared for immediate delivery.

10. *Indications for the use of forceps* are: (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (a) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior, (*b*) mento-anterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below

100 per minute). (4) *Accidental complications:* Hemorrhage; prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both (Jewett). *Conditions necessary for the use of forceps* are: (1) The rectum and bladder must be empty; (2) the os uteri must be fully dilated; (3) the membranes must be ruptured; (4) the pelvis must be of sufficient size.

GYNECOLOGY.

1. *Vaginal examination* may show, with regard to the *cervix*, changes in position, shape, size, consistence, together with the presence or absence of erosions and lacerations.

2. "In *syphilis* the inguinal glands are involved, there is a single area of ulceration, and specific treatment gives positive results. In *tuberculosis*, on the other hand, the inguinal glands are seldom involved, the ulceration is multiple, and the results of specific treatment are negative.

TUBERCULOSIS.	CARCINOMA.
Very slow in development.	Not so slow.
Several nodules.	Single nodule.
Ulceration superficial.	Usually deep.
Margins of ulcer not everted.	Everted and undermined.
Margins of ulcer slightly infiltrated.	Marked infiltration.
Surface covered with bright red granulations.	Surface fungoid in appearance.
Tendency to repair ending with cicatrices.	No formation of cicatrices.
Rarely affects general health.	Cachexia.

(Ashton's *Gynecology.*)

3. The *principal points of diagnostic importance in abdomial examinations* are: Inspection, palpation, percussion, mensuration, and auscultation. By *inspection*, we can note the contour of the abdomen (hernia, ascites, tumors, pregnancy), movements of the abdominal walls (fetal movements), and the appearance of the skin (pigmentations, edema, lineæ albicantes, dilated veins). By *palpation*, we can note the presence of a tumor, the situation and origin of a tumor, the shape and mobility of a tumor, the consistency of a tumor, crepitation (peritonitis, adhesions), and local tender-

ness (peritonitis). By *percussion*, we note the presence of a tumor (solid tumor, ascites, tympanites), situation and origin and shape of a tumor. By *mensuration*, we can note the origin and nature of an enlargement. By auscultation we can note fetal heart sounds, sounds of placental circulation, vascular murmurs in uterine tumors and aneurysms, friction sounds in peritonitis, and movement of gas in the intestines. (From Ashton's *Gynecology*).

4. A *mass in the right lower abdomen* may be: Appendicitis, fecal impaction, intussusception, floating kidney, pyosalpinx, ovarian tumor or abscess or cyst, hematoma or hematocele, inguinal hernia, fibroid tumor.

5. *Symptoms of tubal pregnancy* are the signs of early pregnancy, hypogastric or inguinal pains, probable history of a previous sterility, probable expulsion of decidual membrane or shreds, softening of the cervix, slight enlargement of the uterus, presence of a distended tube, contractions of the wall of the gestation sac; if rupture occurs, there will be sudden, excruciating pains over the lower abdomen and on the affected side, shock, collapse, and symptoms of internal hemorrhage.

6. The *uses of the uterine sound* are: (1) to demonstrate the mobility of the uterus; (2) to show the size of the uterus; (3) to show the presence of intrauterine growths; (4) to indicate deviations in the cervical canal; and (5) as an aid in the diagnosis of uterine displacements.

7. The *following symptoms may follow retroversion of the uterus:* Backache, bearing-down pains, a feeling of pressure in the pelvis, constipation, hemorrhoids, frequent or painful urination, leucorrhea, menstrual disturbances, as dysmenorrhea or menorrhagia, sterility; there may also be *general symptoms*, as headache, indigestion, nausea, anorexia, neurasthenia, and general malaise.

8. *Causes of dysmenorrhea:* Pelvic congestion, pelvic inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis or obstruction of the cervix, prolapse or displacement of the uterus.

9. *Gonorrhea in women is so serious* on account of the possible results: Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomata of vulva, abscess of Bartholin's glands. It often leads to chronic invalidism, and may be the cause of death.

10. *Urethral caruncle* is a small red fleshy growth

generally situated on the posterior part of the meatus of the urethra. There are local pain and tenderness, which may be excessive; a burning sensation is experienced on urination; it may bleed. The proper treatment is to excise it or destroy it with the thermocautery.

SURGERY.

1. In *punctured wound of the foot, made by a pitchfork:* First of all, take a smear and a culture from the wound, and examine for tetanus bacilli; if these are found tetanus antitoxin should be administered in doses of 10 cc. daily for a fortnight. The wound is then to be enlarged by incision, disinfected, and drained; foreign matter must be removed; injured vessels, nerves, or tendons must be treated separately.

2. "*Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the Eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided. A moderate spray of Dobell's solution may be used. If pain is present, dry heat, in the form of hot-water bottle, hot stone wrapped in flannel, etc., may be applied. A few drops (100), warmed, of a carbolic acid solution (1:40), or one of formalin (1:2000), may be instilled into the ear.

3. "*Chronic follicular conjunctivitis* and *trachoma* sometimes resemble each other. The former occurs in youth. The granulations are small, round, in rows, occurring especially on the nasal half of the conjunctiva of the lower lid and edge and extremities of the cartilage of the upper lid. The disease is amenable to treatment and the granulations disappear without leaving a trace. *Trachoma*, on the contrary, is a progressive disease, lasting for many years. The granulations are, as a rule, larger, less prominent, more uniformly distributed, and at last disappear, leaving cicatrices."

4. A *carbuncle* is a localized inflammation of the subcutaneous tissue, which goes on to sloughing, and is of a more extensive character than a boil. Staphylococci are the common exciting cause, while the predisposing causes are lowered vitality from diabetes, albuminuria, or after infective fevers. Inoculation is by autoinfection or directly from the surface. The disease begins as an infiltration of a patch of subcutaneous tissue,

which is hard, painful, and tender, and the skin over it is red and hot, The infiltration may extend till it is the size of a dinner-plate, and the inflammation ends in sloughing and suppuration, not only of the subcutaneous tissues, but of small areas of the skin over it, so that openings develop in the skin, and allow of the exit of pus and sloughs. The openings extend, the sloughs separate, and the wound heals by granulation. The back is a common situation. Sometimes the face is affected, and there is then a danger of thrombosis extending to the cavernous sinus and producing pyemia. *Treatment* is very satisfactory if properly carried out. An anesthetic should be given, the slough thoroughly scraped away, the surface left treated with pure carbolic acid and dressed with antiseptic gauze. The patient should be fed on eggs, milk, cream, meat juice, and brandy. Codeine is necessary in diabetes. —(*Aids to Surgery.*)

5. *Typhoid fever and appendicitis:* In appendicitis, the pain and rigidity are more marked than they are in typhoid; in typhoid the pulse is slower than in appendicitis; there is a leucocytosis in appendicitis, and a leucopenia in typhoid; the Widal reaction is present in typhoid, not in appendicitis; as a rule typhoid is gradual in onset, accompanied by headache, backache, weariness and sometimes by epistaxis; in typhoid also there will be found enlarged spleen, steady rise of temperature, relatively low pulse rate, the rash, and the typhoid bacilli may be found in the blood.

6. In amputation at the middle third of the leg, the arteries to be ligated are: Anterior tibial, posterior tibial, peroneal.

7. In Pott's disease, the anterior part of the bodies of the vertebræ are most commonly affected. The body of the affected vertebræ is gradually destroyed, and the affection spreads, under the anterior common ligament, to the neighboring vertebræ. As a result of the destruction of the bodies of the vertebræ, the spine bends, and a posterior angular deformity occurs. Pus may form, and caries be found in the affected bodies.

8. OSTEOMYELITIS. *Symptoms:* Sudden onset; pain, tenderness, fever, chills, swelling of soft parts; sometimes the joint can be moved gently without pain; septicemia or pyemia may be present.

It is to be *diagnosed* from (1) *Rheumatism*, in which more than one joint is affected and the tenderness is *in* the joint, and not *near* it. (2) *Tuberculous arthritis*, in which the onset is slow and the trouble starts in the

epiphysis rather than in the diaphysis. (3) *Cellulitis*, in which the bone and periosteum are not affected, and in which there is always a wound.

Treatment consists in relieving the constitutional symptoms and preventing the bone from necrosing. An incision down to the bone is made; if pus is beneath the periosteum, the latter is also incised; a piece of bone is removed by chisel or trephine, pus is removed, the endosteum is hurt as little as possible, the wound is irrigated with hot bichloride solution and packed with gauze; the soft parts are closed and the wound well drained. In case this fails, amputation may be necessary.

9. The chief *bacteria of suppuration* are: Streptococcus pyogenes; staphylococcus pyogenes aureus, albus, and citreus; bacillus coli communis; bacillus pyocyaneus, pneumococcus, bacillus typhosus, gonococcus, and bacillus tuberculosis. The streptococcus is the most virulent, and probably the staphylococcus pyogenes aureus the next.

10. The following table, from Eisendrath's *Surgical Diagnosis*, gives the diagnosis (see page 359).

PHYSICAL DIAGNOSIS.

1. *Râles:* (abridged from *Pocket Cyclopedia*).

VARIETY.	HOW AND WHERE PRODUCED.
Amphoric	By movement of air in a tense-walled cavity containing air and communicating with a bronchus.
Bubbling	By passage of air through mucus in the treachea bronchi, and bronchioles.
Cavernous	By passage of air through a small cavity with flaccid walls, which collapse with expiration.
Crackling, dry	By the breaking down of lung tissue.
Crackling, moist	By fluid in very small cavities, and finer bronchi.
Crepitant	By passage of air into vesicles collapsed, or containing fibrinous exudation. Usually at the base of the lungs.

(*Table continued on page* 360.)

COMA FROM INTRACRANIAL INJURY.	APOPLECTIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Deep coma; may have history of onset after fall or injury. Evidence of fracture of vertex or base.	Deep coma; sudden onset. If any injury, only a scalp wound.	Can be aroused by supraorbital pressure unless very profound.	Can be aroused unless very deep.
Pupil dilated on side of lesion. Choked disc.	Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse very slow.	Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse more rapid than normal, and full	Pulse rapid, may be irregular.
Respiration slow and stertorous.	Respiration slow and irregular.	Regular respiration.	Respiration very slow —may be 6 to 8 per minute.
Temperature higher—101°.	Temperature higher on paralyzed side, but lower in rectum.	May be low or normal.	
Urine normal or contains trace of albumin.	Urine contains trace of albumin, but may be same as in uremia.	Normal.	Normal.
Hemiplegia on opposite side to that of injury. If contusion of brain is also present, may have generalized convulsions.	Hemiplegia with convulsions on one side.		

VARIETY.	HOW AND WHERE PRODUCED.
Dry	By narrowing of the bronchial tubes from thickening of the mucous lining, from spasmodic contraction of the muscular coat, viscid mucus within, or pressure from without.
Friction	By the rubbing together of serous surfaces, roughened by inflammation or deprived of their natural secretion.
Gurgling	By the passage of air through fluid in cavities, on coughing.
Moist	By the passage of air through bronchi containing fluid.
Mucous (of Laennec)	By viscid bubbles bursting in the bronchial tubes.
Râle redux, râle de retour.	By the passage of air through fluid in a bronchial tube.
Sibilant	By narrowing of the smaller bronchi from viscid mucus adhering to the walls, from thickening of the lining membrane or spasmodic contraction.
Sonorous	By lessened caliber of the larger bronchi, from spasm, tumefaction of mucous lining, or external pressure.
Subcrepitant	By passage of air through mucus in the capillary bronchial tubes.

2.—

PLEURISY WITH EFFUSION.	LOBAR PNEUMONIA.
Moderate fever of continuous type; declines by lysis.	Fever, 102° to 104° F.; falls by crisis.
Prostration moderate.	Prostration extreme.
Unilateral distention of the thorax.	Absent.

PLEURISY WITH EFFUSION.	LOBAR PNEUMONIA.
Countenance pale and anxious.	Mahogany-colored flush of cheeks.
Limited expansion at base of chest on the affected side.	Degree of expansion slightly, if at all, inhibited.
Tactile fremitus diminished or absent.	Increased over area of consolidation.
Interspaces bulging at base of chest.	Absent.
Percussion shows flatness, with great resistance to the pleximeter finger.	Dullness with less resistance, and sometimes a tympanitic note.
Diminished or absent breath-sounds over effusion the rule. Respiration murmur diffuse, distant, and generally unaccompanied by râles. Bronchial breathing may be present over the entire affected side of the chest.	Harsh bronchial breathing and presence of râles in first and third stages, unless a bronchus is plugged.
Friction sound heard in early and late stages.	No friction murmur; râles present.

3. *Impacted stone in the right ureter* causes colic, which comes on suddenly and occurs in spasms of excruciating pain, which is referred to the kidney and ureter and to the testis and penis. Collapse, cold sweats, nausea and vomiting, retraction of the testis, frequency of micturition and strangury are present. To differentiate it from *renal colic*, the röentgen-ray is necessary. "It is diagnosed from *biliary colic* by the absence of jaundice and the localization of pain at a lower level; from *peritonitis*, *appendicitis*, and *intestinal obstruction* by the absence of rigidity of the abdominal walls, distention of the bowels, or stercoraceous vomiting; from *severe lumbago* by the reference of the pain to the urinary organs, and the absence of exacerbations on muscular movements." (Buchanan's *Surgery*).

4. *Physical signs of pyloric stenosis:* There is an abnormal prominence of the epigastric region; a tumor in the region of the pylorus which seems to be connected with the stomach; percussion gives a tympanitic note (if the stomach is empty), extending to or below the

umbilicus; if the stomach is full, the note is high pitched; on auscultation, a splashing and rumbling sound is heard.

5. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at the end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

HYGIENE.

1. *The means of purification of public water supplies* are storage and sedimentation, chemical treatment, and filtration. *Sedimentation.* A part of the impurities in the water may be removed therefrom by storing the water in basins where the suspended matter sinks by the action of gravity, and in the process of settling entangles other impurities, as well as some of the bacteria in the water. In order to get good results, the basins must be shallow, the water left undisturbed, and the accumulated sediment removed from time to time. No complete reliance can be put on this method, as it does not guarantee a germ-free water. *Chemical purification:* The sedimentation of water in the basins may be hastened by the addition to the water of certain chemicals, which act as coagulants and form precipitates, entangling the organic impurities and bacteria, thus freeing the water from a large part of them. Alum (half a grain to the gallon), chlorine, bromine, copper sulphate, metallic iron, and ozone are used for this purpose. Neither sedimentation nor chemical purification are practicable for large water supplies, nor are they free from many objections. *Filtration:* This is the only method which has proved successful in providing a pure water supply. Filtration of large quantities of water is accomplished by means of sand beds of large area, the sides and bottoms of which are concreted, and on the bottom of which are placed numerous perforated and open drains which are to lead off the filtered water into separate special reservoirs. On the bottom of the filter areas, which are usually half or an acre in size, is placed a layer of coarse gravel, upon this a layer of finer gravel, which is then covered by a layer of fine, sharp sand, several feet in thickness, the whole filtering medium being from 4 to 6 feet in thickness. The filter is at first filled from beneath so that all air is driven off, and the filter area is then

filled to a level of several feet above the filter bed. A filter of an acre in area may be made to filter two to four millions of gallons of water in twenty-four hours. Such filters act not only mechanically in intercepting all suspended impurities, but the slimy sheet which soon covers the top layer of the sand acts biologically upon the water and destroys a large number of bacteria, so that, it is claimed, the water may be freed from 99 per cent. of its bacteria, provided the rate of filtration is not too rapid and the top of the sand-layers is scraped off half an inch from the surface from time to time. (From Price's *Essentials of Hygiene.*)

2. *Immunity* is insusceptibility, or capacity for resistance on the part of the body to disease or, in the more limited sense, to infection or intoxication or their effects. Immunity may be *natural* or *hereditary.* The absolute or relative insusceptibility of turtles and fishes for tetanus, and of the lower animals for syphilis and for scarlatina, are examples of hereditary or natural immunity. On the other hand, immunity may be *acquired.* Acquired immunity may be secured by an attack of the disease from which the individual has recovered—*natural immunization.* Or immunity may be acquired by the introduction into the body of some material which gradually diminishes susceptibility without inducing distinct disease—*artificial immunization.* (Delafield and Prudden.)

3. "The clothing and bedding which are to be disinfected by means of stream should be carefully wrapped in cloths saturated with 1 per cent. carbolic acid solution, placed in a wagon, and taken to the disinfecting station. After the bed has been stripped, all refuse matter, paper, and articles of little value are wrapped in cloths saturated with carbolic acid and burned in a stove or furnace. The floor, doors, windows, furniture, and the walls for a distance of 1½ meters from the floor should be washed with 5 per cent. carbolic acid solution. The walls and ceiling of the room should subsequently be sprayed with 1: 1000 bichloride of mercury solution. If the walls are papered, it is advisable to remove carefully the paper before beginning the disinfection. The room is then closed as tightly as possible and disinfected by means of formaldehyde." (Bergery's *Hygiene.*)

4. *Essentials for the production and preservation of pure dairy milk:* Vaughan's rules are as follows: "(1) The cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must

not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day, to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60° F., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered, during the summer, in refrigerated cans or in bottles about which ice is packed during transportation. (8) When received by the consumer, it must be kept in a clean place, and at a temperature some degrees below 60° F."

5. *Mortality rates* are calculated at so many deaths per 1,000 of the population. The death rate is found by dividing the number of deaths by the number of the population, and multiplying the result by 1,000.

Example: In a population of 4,000 there are 60 deaths, hence the death-rate is

$$\frac{1000 \times 60}{4000} = 15 \text{ per } 1{,}000 \text{ of population}$$

STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF MARYLAND.

ANATOMY.

1. Describe articulations of superior maxillary bone.
2. Describe the elbow joint, name the ligaments, and give their attachments.
3. Give location and size of stomach when empty.
4. Superficial and deep origin and arrangement of fibers in commissure, of optic nerves.
5. Where would you locate lesion in a case of aphasia?
6. Describe valves of heart.

7. Give origin, insertion, action and nerve supply of following muscles: (*a*) Obliquus internus. (*b*) Obturator externus. (*c*) Omohyoideus. (*d*) Serratus magnus.
8. Through what vessels would circulation be established after ligation of brachial artery in lower third?
9. Where are semicircular canals located, and by what bony openings do they communicate with the middle ear and with the cranial cavity?
10. What is the mesentery?

PHYSIOLOGY.

1. (*a*) Describe the normal flow of blood through the arteries, capillaries and veins, and factors which cause the flow of each. (*b*) Give the relative rates of circulation in the arteries, capillaries and veins, and state how long it takes the blood to make a complete circuit of the body. (*c*) What is the total quantity of blood as compared with weight of the body?
2. (*a*) Define absorption and secretion. (*b*) Give some of the theories of absorption. (*c*) State difference between internal and external secretions, and give examples.
3. (*a*) Define animal heat and give sources. (*b*) State some of the conditions which produce variations in the normal temperature. (*c*) Give normal temperature in axilla, mouth, and rectum.
4. What is accomplished physiologically by the portal circulation?
5. Where is the respiratory center located and what is internal respiration?
6. (*a*) What are the functions of the bile—the ingredients and how secreted? (*b*) Give tests for bile salts and bile acids.
7. Describe the function of the Eustachian tube, retina, iris, cornea, and tympanic membrane.
8. Give the locations at which the various heart sounds can be best heard and state the cause of each sound.
9. Discuss briefly the physiology of the nervous system and give a classification of the nerve cells.
10. What is blood pressure—mode of ascertaining—the average blood pressure in male and female.

CHEMISTRY.

1. Give symbol, valence and one important compound of each of ten elements.
2. Describe nitrogen. In what form is it chiefly eliminated from the body? Name several compounds containing nitrogen and give formulæ.

3. Describe lead. (*a*) Which of its compounds is used in medicine? (*b*) From what sources may chronic lead poisoning come?

4. Give two antidotes for phosphorus and explain their action.

5. Give a chemical antidote for each of the following and explain mode of action: Phenol, nitric acid, oxalic acid, mercuric chloride.

6. Wood alcohol and grain alcohol: (*a*) Give formulæ and state the class of chemical substances to which they belong. (*b*) How would you treat a case of poisoning by the former, supposing the case were seen shortly after ingestion of the substance?

7. Why is a salt of mercury incompatible with KI?

8. What is synthesis? Name three synthetic organic substances used in medicine.

9. Describe method of determining the sugar content of the blood.

10. What substance is used as an antidote for most alkaloids and how does it act?

MATERIA MEDICA.

1. Mercury; the official preparation, doses, and incompatibles.

2. Lead; the official preparations and incompatibles.

3. Write a prescription using official terms, containing at least three ingredients, for diarrhea in an adult. Also one for a child 2 years old containing three ingredients.

4. Give the average hypodermic dose for an adult of apomorphine, morphia sulphate, nitroglycerin, atropine sulphate, and pituitary extract.

5. Ergot; the official preparations and doses.

6. Potassium: the official preparations and doses.

7. Name three drugs which are motor nerve depressants; three which are sensory nerve depressants, and give adult dose of each.

8. (*a*) Define antiseptics and name three that are used internally with adult dose. (*b*) Name three that are used externally and give strength of same, using official terms.

9. Write a prescription as a diuretic containing three ingredients, using official terms.

10. Define antitoxins and vaccines. Name those in most general use, give source and method of administering.

THERAPEUTICS.

1. Flexile collodion, and cantharidal collodion; their therapeutic uses.

2. Give the therapy of boric acid and methods of use.
3. Acid salicylicum, its therapy and usual combination for internal administration.
4. Sodii bicarbonas, properties and uses, incompatibles.
5. Spiritus ætheris nitrosi, its properties, uses and adult dose.
6. Aethylis chloridum, properties and uses, and objections to its use.
7. Alumen, properties and uses, value of the exsiccated.
8. Arseni trioxidum, therapy, liquid preparations and state which can be administered with acids.
9. Hexamethylenamin, properties and uses, mode of action and danger from large doses.
10. Write a prescription in Latin, without abbreviation, containing four ingredients (with "Fowler's solution" as one) stating condition for which used.

PATHOLOGY.

1. What are infective granulomata? Mention several and describe one.
2. Briefly discuss teratomata.
3. Describe ingrowing toenail.
4. What are anaerobic bacteria? Classify, and mention an organism belonging to each class.
5. Describe keloid tissue.
6. Define the terms secretion, excretion, transudate, exudate.
7. What is meant by "sensitization"?
8. What are the general characteristics of sarcoma in contrast to carcinoma?
9. Describe the beef tape worm.
10. What are the means used to prove that death has positively occurred? What is rigor mortis?

PRACTICE OF MEDICINE.

1. What diseases are liable to occur in the right inguinal region?
2. Give signs and symptoms of floating kidney.
3. Give causes of malaria and varieties of organisms.
4. Name the eruptive fevers and also give period of incubation in each.
5. What is hemophilia and how treated?
6. Differentiate the terms delusion and hallucination and also define the terms epistaxis, hemoptysis, and hematemesis.
7. Give symptoms of diabetus mellitus and treatment.
8. Name causes of interstitial nephritis and the more common complications.

9. Describe empyema; give diagnosis and treatment.
10. Give differential diagnosis between gout and arthritis deformans.

OBSTETRICS AND GYNECOLOGY.

1. Define a trefoil, horseshoe, succenturiate, and battledore placenta.
2. What is a caput succedaneum and how is it formed?
3. Describe your method of preventing lacerations of the perineum during delivery.
4. What is your treatment in the delivery of twins with heads interlocked?
5. What is the danger of a prolapsed cord and how do you treat it?
6. What is phlegmasia alba dolens, its cause and treatment?
7. How do you diagnose a face from a breech presentation?
8. Why is a face presentation hard to deliver?
9. Give differential diagnosis between a retroflexed gravid uterus, and a pregnancy complicated by ovarian tumor.
10. What is the usual cause of salpingitis? Describe its course and treatment.

SURGERY.

1. Give cause and treatment of chronic suppuration of the middle ear.
2. Give diagnosis, symptoms, and treatment of gonorrheal conjunctivitis.
3. Give signs, symptoms, diagnosis, complications, and treatment of phlebitis.
4. Give symptoms and treatment of Pott's disease.
5. Give the differential diagnosis between fracture of neck of humerus and dislocation of shoulder joint. Outline the treatment of one.
6. What are the causes of ischiorectal abscesses? Give symptoms and treatment.
7. Describe a rodent ulcer. Give the structures in which rodent ulcer mostly develops, and give surgical treatment.
8. If called to a patient with a compound fracture of a leg in the lower third, which had been kicked by a horse in a barnyard, state in detail how you would treat such a case.
9. Give varieties of ileus, and some of the causes of each. Outline treatment.
10. Give the symptoms and physical signs of carcinoma of the breast.

MARYLAND.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF MARYLAND.

ANATOMY.

1. The *superior maxillary bone articulates with*: The frontal, ethmoid, malar, nasal, lacrimal, palate, vomer, inferior turbinated, and the superior maxillary of the opposite side; sometimes it articulates also with the sphenoid.

2. The *elbow-joint* "is a ginglymoid articulation formed above by the lower extremity of humerus, below by upper extremities of ulna and radius. Its ligaments are external and internal lateral, anterior and posterior ligaments. *External lateral* arises from external condyle of humerus and is inserted into outer margin of ulna. *Internal lateral*, much stronger, consists of two portions; *anterior* arises from fore part of internal condyle to be inserted into coronoid process, and *posterior* from back part of condyle to inner margin of olecranon. *Anterior* ligament arises above coronoid fossa, and is inserted into coronoid process of ulna and orbicular ligament. *Posterior ligament*, attached above olecranon fossa, and below to olecranon process of ulna. The anterior and posterior ligaments become continuous with the lateral to encircle the joint."—(*Young's Anatomy.*)

3. The *stomach*, when empty, lies in the epigastric and left hypochondriac regions, at the back part of the abdomen, and is immediately below the diaphragm; its length is about 10 inches, its breadth 3 to 4 inches, and its antero-posterior diameter about 2 to 3 inches.

4. The *optic nerves* arise from the forepart of the optic commissure, which is the decussation of the fibers in the optic tract; most of the fibers decussate (these are arranged internally), a few pass to the eye of the same side, and a few of the posterior fibers do not decussate but pass across the commissure from one cerebral hemisphere to the other.

5. In *aphasia* (in a right-handed person) the lesion would be located in the posterior part of the third frontal convolution of the left cerebral hemisphere.

6. *The valves of the heart* are: In the *right auricle*, the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculoventricular orifice. In the fetus it directs the blood from the inferior vena cava through the foraman ovale into the left auricle; the

coronary valve prevents the regurgitation of the blood into the coronary sinus during the auricular contraction. In the *right ventricle* are the tricuspid and semilunar valves; the former prevents the blood in the right ventricle from flowing back into the right auricle during ventricular cystole; the latter guards the orifice of the pulmonary artery. In the *left ventricle* are the mitral and semilunar valves; the former acts similarly to the tricuspid; the latter guards the orifice of the aorta. The *tricuspid valve* consists of three cusps, or segments, the bases of which are attached to a ring around the auriculo-ventricular opening, while the edges are free in the ventricle and are attached to the upper end of the chordæ tendineæ. The *pulmonary semilunar valve* is composed of three segments, attached at their bases to the wall of the pulmonary artery and having on their free edges a nodular projection, the *corpus Arantii*. The *initial valve* has two cusps, and is otherwise of similar structure to the tricuspid valve. The *aortic semilunar valve* resembles the pulmonary valve in structure.

7. OBLIQUUS INTERNUS. *Origin*: Outer half of Poupart's ligament, anterior two-thirds of crest of ilium, and from lumbar fascia. *Insertion*: Crest of pubis, pectineal line, linea alba, and cartilages of seventh, eighth, and ninth ribs. *Action*: Compression of abdominal viscera (thus aiding in vomiting, urination, defecation, and parturition), compression of thorax (thus aiding in expiration). *Nerve supply*: Lower intercostal nerves, and iliohypogastric.

OBTURATOR EXTERNUS. *Origin*: Body and ramus of os pubis, ramus of ischium, and obturator membrane. *Insertion*: Digital fossa of femur. *Action*: External rotator of thigh. *Nerve supply*: Obturator nerve.

OMOHYOIDEUS. *Origin*: Upper border of scapula. *Insertion*: Body of hyoid bone. *Action*: Depresses and retracts hyoid and larynx. *Nerve supply*: Descendens and communicans hypoglossi.

SERRATUS MAGNUS. *Origin*: Eight upper ribs. *Insertion*: Inner margin of dorsal border of scapula. *Action*: Elevates ribs in inspiration, is used in pushing, and raising the arm. *Nerve supply*: Posterior thoracic nerve.

8. When the *brachial artery is ligated in the lower third*, the *collateral circulation* is carried on as follows: The superior profunda anastomoses with the radial recurrent, and posterior interosseus recurrent; and the inferior profunda anastomoses with the posterior ulnar recurrent and anastomotica magna.

9. The *semicircular canals* are located in the internal ear, above and behind the vestibule. They open into the vestibule by five apertures: The ampulla ossea superior, crus commune, ampulla ossea posterior, macula cribrosa inferior, and ampulla ossea lateralis.

10. The *mesentery* is the fold of peritoneum which connects the jejunum and ileum with the posterior abdominal wall.

PHYSIOLOGY.

1. The *circulation of the blood* is the course or circuit of the blood from the heart, through the body and back to the heart. Beginning at the left ventricle of the heart, the blood flows through the left semilunar valve into the aorta, from which branches are distributed to every part of the body, through the capillaries to the veins, from the veins to the venæ cavæ, thence to the right auricle of the heart. From the right auricle, through the tricuspid valve to the right ventricle, thence through the right semilunar valve to the pulmonary artery to the lungs, from the capillaries in the lungs to the pulmonary veins, thence to the left auricle, and through the mitral valve to the left ventricle, to begin the circuit again.

The circulation of the blood is regulated in (a) *the arteries* by: (1) The elasticity and tone of the arteries, (2) the force and frequency of the cardiac contractions, (3) the resistance in the capillaries; (b) in the *capillaries* it is regulated by (1) the action of the heart, (2) the action of the arteries; (c) in the *veins* it is regulated by (1) the action of the heart, (2) aspiration of the thorax, (3) the contraction of the muscles, and (4) slightly by the valves in the veins.

The velocity of the blood current is about 1 foot per second in the arteries; about 1 inch per minute in the capillaries; and about 8 inches a second in the veins. The complete circulation around the body is said to occupy a little less than half a minute.

The total quantity of blood was formerly said to be about one-thirteenth of the weight of the body; recently this figure has been altered to one-twentieth of the body weight.

2. *Absorption* is the process by which the products of digestion are taken up into the general circulation. It occurs with greatest activity in the villi of the small intestine.

The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein; and (2) by the lymph vessels of the small in-

testine, which converge to empty into the thoracic duct. The water, inorganic salts, proteids and sugar go by way of the portal vein to the ascending vena cava; and the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

The process by which absorption is accomplished is partly physical (osmosis and filtration), and is also due in part to selective action. To be absorbed by the blood-vessels or lacteals the substances must be in a fluid state, and the more dilute the solution the more rapid the absorption. The absorbed matter must be rapidly removed and fresh blood supplied to the capillaries.

Secretion means the process by which some of the constituents of the blood are separated from the blood stream (by the activities of the capillary endothelium, as the blood passes through the capillaries) and elaborated into other material. The products of secretion vary with the gland or membrane where it occurs. Thus: Saliva, tears, milk, bile, gastric juice, synovial fluid, serous fluid, pancreatic juice.

Internal secretions: It is generally held now that the glandular organs, chiefly the pancreas, liver, and the ductless glands, produce a secretion, peculiar in each case to the particular gland producing it, and which is supposed to be given off to the blood or lymph, and to have some peculiar value in the general metabolism of the body. Such secretions are called internal secretions, in contradistinction to the previously known secretions, which are carried off by a duct, and are known as external secretions.

3. *Animal heat* is the heat produced in living organisms by the processes of oxidation.

Heat is produced in the body by: (1) Muscular action; (2) the action of the glands, chiefly of the liver; (3) the food and drink ingested; (4) the brain; (5) the heart; and (6) the thermogenetic centers in the brain, pons, medulla, and spinal cord.

Conditions which produce variations in the normal temperature: Age, time of day, position, whether sleeping or awake, whether working or resting. The normal temperature, in *axilla*, is about 37° C.; in *mouth*, about 37.5° C.; in *rectum*, about 38° C.

4. The function of the portal circulation is to carry the venous blood from the stomach, intestines, pancreas and spleen to the liver. The blood thus carried is loaded with the products of absorption. In the liver this blood enters into close relation with the hepatic cells, and is finally carried to the inferior vena cava.

Further, the ordinary functions of the liver are due, in part, to the portal circulation. These functions are: Manufacture and storage of glycogen; formation of urea, uric acid and creatinin; formation of bile, and manufacture of heat.

5. The *respiratory center* is situated in the lowest part of the floor of the fourth ventricle, at the calamus scriptorius. *Internal respiration* is the interchange of gases between the blood or lymph and the cells of the various tissues of the body. The term is used in opposition to *external respiration*, which is the interchange of gases occurring in the lungs.

6. The *functions of the bile* are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach, and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

Bile is composed of water, sodium glycocholate, sodium taurocholate, mucin, cholesterin, lecithin, fats, pigments (bilirubin and bilverdin) and inorganic salts (chiefly sodium chloride, potassium chloride, calcium phosphate, magnesium phosphate, and iron phosphate).

"The *secretion of bile* is a continuous process, and in periods when digestion is not taking place, bile accumulates in the gall-bladder. About the third hour after a meal is taken the gall-bladder is emptied into the lumen of the duodenum, but the mechanism by which the contents are expelled has not yet been ascertained. Bile continues to flow into the intestine during the digestive process, and, later, again accumulates in the gall-bladder. . . . So far as is known, the secretion of bile is independent of nervous action, and is excited (1) by the reabsorbed bile salts, and (2) by secretin."—(Bainbridge and Menzies' *Essentials of Physiology*.)

Test for bile-salts: Sprinkle some flowers of sulphur on the surface of a solution containing bile salts; the sulphur will sink, whereas on most other liquids it will float.

Test for bile-acids: To a thin film of bile in a capsule add a drop of solution of cane sugar and a drop of concentrated sulphuric acid; a purple color is obtained.

7. *Function of the Eustachian tube* is: (1) To main-

tain equilibrium between the atmospheric pressure in the middle ear and the outside air. (2) The cilia on the epithelium lining the tube filter the incoming air from the pharynx and so aid in keeping bacteria out of the middle ear. (3) It may act as a drainage tube for the middle ear. (4) It may possibly have some function as a resonating tube, as may be observed when it is closed in catarrhal conditions, when the voice sounds strange both to the patient and to others.

Function of the retina is to receive the stimulus of light and transform it into a nervous impulse which is carried to the brain by the optic nerve.

Function of cornea is to allow light to pass from outside to the retina.

Function of iris is to regulate the amount of light which enters the eyeball and falls upon the retina; it also regulates the size of the pupil, and reduces both spherical and chromatic aberration.

The *function of the typmanic membrane* is to receive the vibrations of the atmosphere which are transmitted to it.

8. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged, the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.*

The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage.

The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) The vibration and closure of the auriculo-ventricular valves, (2) the muscular sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall.

The *second* sound is caused by the vibration due to the closure of the semilunar valves.

9. *Physiology of the Nervous System:* "The primary elements of the nervous system are the neurones and the neuroglia, the former being the discharging and conducting structures, and the latter the supporting. The *neurone* is the essential element of the nervous system, which may be regarded as built up of an enormous number of them arranged in series, and occupying definite tracts. A neurone consists of a nerve cell and its branches (axon and dendrons or dendrites). The *dendrons* belonging to a single cell may be many, or there may be but one; in either case they are short

processes, soon subdivided into many terminal branches forming an arborisation. They are made up of fibrillæ, and of granular matter lying between the fibrillæ, which are continuous, through the body of the cell itself, with the fibrillæ of other dendrons or of the *axon*. This process, entirely composed of fibrillæ, gives off collaterals at right angles to its course, and these, like the axon itself, often end in an arborisation around the dendrons of another nerve cell. These places of linkage of one neurone with another are called synapses. An axon may be either long or short; in the former case it does not branch for a considerable distance, becomes surrounded with myelin, and passes as a nerve fiber into the white matter; in the latter it breaks up into branches close to its cell, which is known as a "link cell," and is confined to the gray matter alone. The dendrons conduct impulses *toward* the cell, the axons *away* from it.

"The *nerve* cell itself, besides its nucleus and nucleolus and the fibrillæ which traverse it, contains a series of angular granules (Nissl's bodies) similar to those of the dendron. They stain deeply with methylene blue, and are an index of the state of health, or degeneration of the cell. The multiplication of nerve cells ceases shortly after birth, but their growth is active, and they have great reparative power.

"The *neuroglia* is composed of a network of delicate interlacing fibrils containing a number of nucleated cells (Deiter's cells) embedded in it. It everywhere interpenetrates the nervous elements, but is most abundant round the central canal of the cord and the ventricles of the brain, and in the substantia gelatinosa of Rolando, which lies at the tip of the posterior cornu of the cord. In the various "scleroses," it is increased at the expense of the nervous elements.

"A neurone is 'efferent' or 'afferent,' according as its axon carries impulses from the central nervous system toward the periphery, or from the periphery toward the center. By the superposition of one efferent neurone upon another, or of one afferent neurone upon another, efferent, descending, or *motor*, and afferent, ascending, or *sensory* paths are built up, which occupy definite positions in the spinal cord and brain."—(Wheeler and Jack's *Handbook of Medicine*.)

Classification of nerve cells.—Schäfer classifies nerve cells as follows: "1. *Afferent cells*, which receive impressions at the periphery to convert them into impulses. The latter then pass toward the central nervous system. 2. *Efferent cells*, which send out nervous im-

pressions toward the periphery. 3. *Intermediary cells*, which receive impressions from afferent cells to transmit them directly or indirectly to efferent cells. 4. *Distributing cells*, which occur near the periphery and, receiving impulses from efferent cells, distribute them to involuntary muscles and secreting cells. The cells of this class belong to the so-called sympathetic system."

10. *Blood pressure* is the pressure of the blood due to the ventricular systole, the elasticity of the arterial walls, and the resistance of the capillaries. The normal arterial blood pressure varies; the systolic pressure being (in males) about 120 to 150 mm. of mercury, and the diastolic from about 90 to 120 mm. of mercury. In females, the pressure is from 10 to 15 mm. lower. Blood pressure is *maintained* by the contraction of the heart, the peripheral resistance, and the elasticity of the arterial walls.

Blood pressure is estimated by a sphygmomanometer. The individual whose blood pressure is about to be recorded should be placed in such a position that his heart, the artery the blood pressure of which is to be determined, and the manometer are at the same level. It is usual to record the pressure in the brachial artery. The india-rubber bag of the instrument should be wrapped round the bared arm, the metal covering of the bag should then be adjusted, and firmly strapped in position. The india-rubber tube leading from the bag is then adjusted to the proximal limb of the U-shaped manometer which contains mercury. The experimenter places the index finger of his left hand over the radial pulse of the subject, and with his right hand he compresses the syringe and so drives air into the india-rubber tube and the india-rubber bag around the individual's arm. The pressure of the air in the bag around the arm is recorded by movement of the mercury from the proximal to the distal limb of the manometer. The operator keeps on pressing the syringe until oscillatory movements are seen at the surface of the mercury in the distal limb of the manometer; the mean point of maximum oscillations registers the diastolic pressure. If the pressure in the bag is still further increased, the oscillations diminish in amplitude and finally disappear, and at this point the pulse can no longer be felt at the wrist. The height of the mercury supported then registers the amount of systolic pressure. It will then be noted that the mercury has descended in the proximal limb of the manometer, and has ascended in the distal limb of the manometer: the difference between the two mercurial levels will be the

blood pressure of the brachial artery. The normal systolic pressure in man is about 120 mm. Hg, and the diastolic pressure about 100 mm. Hg. In women the pressures are about 10 per cent. less. In children the systolic pressure may be as low as 90 mm. Hg, with a diastolic pressure of about 80 mm. Hg.—(R. Hutchison.)

1. CHEMISTRY.

ELEMENT.	SYMBOL.	VALENCE.	ONE COMPOUND
Hydrogen	H.	1	Hydrogen monoxide, H_2O
Oxygen	O.	2	Nitrogen monoxide, N_2O
Carbon	C.	4	Ether $(C_2H_5)_2O$
Nitrogen	N.	3 or 5	Ammonia, NH_3
Chlorine	Cl.	1	Hydrochloric acid, HCl
Potassium	K.	1	Potassium iodide, KI
Sodium	Na.	1	Sodium chloride, NaCl
Arsenic	As.	3 or 5	Arsenic trioxide, As_2O_3
Calcium	Ca.	2	Calcium sulphate, $CaSO_4$
Iron	Fe.	2 or 4	Ferric chloride Fe_2Cl_6

2. *Nitrogen* is a colorless, odorless, tasteless gas, noncombustible, very sparingly soluble in water, very slow to enter into combination; it is not poisonous, but it does not support respiration.

It is chiefly eliminated from the body in the form of urea.

Compounds containing nitrogen: Urea, CON_2H_4; ammonia, NH_3; nitrogen monoxide, N_2O; nitrogen dioxide, NO; nitrogen monoxide. N_2O_3; nitrogen tetroxide, N_2O_4; nitrogen pentoxide, N_2O_5; nitrous acid, HNO_2; nitric acid, HNO_3; hydrocyanic acid, HCN; lead nitrate, $Pb(NO_3)_2$; ethyl amin, $C_2H_5NH_2$.

3. *Lead* is a bluish-white metal, soft and pliable; not very ductile or malleable, a poor conductor of electricity but somewhat better conductor of heat, is readily oxidized when exposed to air; its atomic weight is 207, and its valence 2.

The compounds used in medicine are the acetate, oxide, iodide and nitrate.

Sources of chronic lead poisoning: Contamination of drinking water which has been in contact with lead; the use of food or chewing tobacco which has been wrapped in tinfoil containing excess of lead; drinking of beer or other beverages which have been in contact with pewter; handling of lead or its alloys; manufacturing processes in which lead or its compounds are used.

4. *Two antidotes for phosphorus*: I. Old, acid, v

rectified French oil of turpentine, which forms with the phosphorus an inert compound of phosphorous acid. 2. Copper sulphate, which, besides being an emetic, may coat the phosphorus with copper.

5. *Chemical antidote for phenol*, sodium sulphate, which with phenol forms the insoluble phenolsulphonate.

Chemical antidote for nitric acid is magnesium oxide or hydroxide, which will dilute and neutralize the acid.

Chemical antidote for oxalic acid is syrup of lime, which forms the insoluble calcium oxalate.

Chemical antidote for mercuric chloride is milk, which forms an insoluble albuminate.

6. *Wood alcohol* is methyl alcohol, $H.CH_2OH$; *grain alcohol* is ethyl alcohol, CH_3CH_2OH. They both belong to the class of hydrocarbon hydroxides.

Treatment of poisoning by wood alcohol: Wash out the stomach, and administer a hypodermic of pilocarpine; strychnine is a serviceable tonic, and the iodides are said to benefit the amaurosis. Rectal injections of normal saline solution are useful.

7. Mercurous chloride is incompatible with KI because by the union of these two the soluble mercuric iodide is formed, which is poisonous. Thus $Hg_2Cl_2 + 2KI = 2KCl + Hg_2I_2$.

8. *Synthesis* is the chemical building up of a compound out of simpler compounds or elements.

Three synthetic organic substances used in medicine: Salicylic acid, antipyrine, and urotropin.

9. *To detect sugar in the blood*: A small amount of blood, obtained by wet cupping, is first freed from proteids, by adding an equivalent weight of sodium sulphate, and then boiling, and filtering, the filtrate thus obtained being used for the test. A solution is now made in a test-tube, by mixing two parts of phenyl-hydrazin hydrochloride and four parts of sodium acetate with about six cubic centimeters of water, and gently heating the fluid, if necessary, to effect solution. Five cubic centimeters of the proteid-free filtrate, while still warm, are added to an equal volume of the test solution. This mixture is then placed in a test-tube half filled with water, heated for half an hour in a water-bath, and allowed to stand until cool. When cooling of the mixture has occurred, it shows under the microscope the presence of the characteristic yellowish crystals of phenyl-glucosazon, either detached or in clusters, together with colorless crystals of sodium sulphate. (DaCosta's *Clinical Hematology*).

10. The antidote for most alkaloids is tannin; it precipitates the alkaloids and their salts and forms tannates which are comparatively insoluble.

MATERIA MEDICA.

1. MERCURY. *Preparations and doses*: Emplastrum hydrargyri; Hydrargyrum cum creta, dose 4 grains; Massa hydrargyri, dose, 4 grains. Unguentum hydrargyri; Unguentum hydrargyri dilutum; Hydrargyri oxidum rubrum; Unguentum hydrargyri oxidi rubri; Hydrargyri oxidum flavum; Unguentum hydrargyri oxidi flavi; Oleatum hydrargyri; Hydrargyri chloridum corrosivum, dose 1/20 grain; Hydrargyri chloridum mite, dose (laxative), 2 grains; (alterative) 1 grain; Pilulæ catharticæ compositæ, dose 2 pills; Hydrargyri iodidum rubrum, dose 1/20 grain; Liquor arseni et hydrargyri iodidi, dose 1½ minims; Hydrargyri iodidum flavum, dose, 1/5 grain; Liquor hydrargyri nitratis; Unguentum hydrargyri nitratis; Hydrargyrum ammoniatum; Unguentum hydrargyri ammoniati.

Incompatibles: *Mercuric chloride* is incompatible with alkalies and their carbonates, potassium iodide, tartar emetic, silver nitrate, lead acetate, lime water, and tannic acid; with *mercurous chloride*, mineral acids, alkalies, ammonia, carbonates, chlorides, cocaine, iodides, lead salts, lime water, sodium bicarbonate, and sugar.

2. LEAD. *Official preparations*: Plumbi acetas, plumbi iodidum, plumbi nitras, plumbi oxidum, liquor plumbi subacetatis, liquor plumbi subacetatis dilutus, ceratum plumbi subacetatis, emplastrum plumbi, emplastrum adhæsivum, unguentum diachylon.

Incompatibles: Alkalies, mineral acids and their salts, opium, potassium iodide, vegetable acids, bromides, carbonates, chloral hydrate, glucosides, salicylic acid, sulphates, tinctures.

3. *For diarrhea, in an adult*:

℞ Salolis, ʒj.
Bismuthi subnitratis.
Cretæ preparatæ āā ʒiv.
Pulveris acaciæ q.s.
Aquæ cinnamoni q.s. ad ʒvj. M.

Sig.: A dessertspoonful every 2 or 3 hours.

For diarrhea, in a child 2 years old:

℞ Bismuthi salicylatis, ʒij.
Glycerin, ʒij.
Misturæ cretæ, q.s. ad ʒiij. M.

Sig.: One teaspoonful every 2 or 3 hours, as necessary.

4. *Average hypodermic dose:* Of apomorphine hydrochloride, gr. 1/10 (as an emetic); of morphine sulphate, gr. ⅛; of nitroglycerin, ♏.j; of atropine sulphate, gr. 1/150; of pituitary extract, ♏.x.

5. ERGOT. *Official preparations and doses:* Ex-

tractum ergotæ, gr. iv; fluidextractum ergotæ, ♏.xxx; vinum ergotæ, ʒij.

6. The *potassium salts, with doses,* are: The acetate, gr. xxx; bicarbonate, gr. xxx; bitartrate, gr. xxx; bromide, gr. xv; carbonate, gr. xv; chlorate, gr. iv; citrate, gr. xv; effervescent citrate, gr. lx; cyanide, gr. 1/5; dichromate, gr. 1/5; ferrocyanide, gr. vij; hypophosphite, gr. vij; iodide, gr. vij; nitrate, gr. vij; permanganate, gr. j; sulphate, gr. xxx; and potassium and sodium tartrate, ʒij.

7. *Three motor depressants*: Aconite (dose of tincture, 10 minims); digitalis (dose of infusion, ʒij); camphor (dose of monobromated camphor, gr. ij).

Three sensory depressants: Opium, dose gr. j; belladonna (dose of tincture, ♏. viij); chloral hydrate, dose gr. xv.

8. *Three antiseptics used internally*: Phenol, dose gr. j, well diluted; creosotum, dose ♏. iij; hexamethylenamine, dose gr. iv.

Three antiseptics used externally: Phenol, 1 to 5 per cent. solution; hydrargyri chloridum corrosivum, 1:1000 to 1:5000 solution; iodoformum.

9. *A diuretic*:

℞ Potassii acetatis.
Potassii bitartratis.
Potassii citratis, āā ʒij.
Aquæ q.s. ad ʒviij. M.

Sig.: One tablespoonful in half a glass of water after each meal.

10. "A *serum* is a product obtained by injecting into an animal, usually a horse, a culture (*e.g.* Diphtheria) or the toxin from a culture (*e.g.* Streptococcus) of the organism. Serums may be subdivided into—(a) *Antitoxic serums*, such as Diphtheria and Tetanus, which are obtained by injecting filtered cultures into the animal used to provide the serum. (b) *Anti-bacterial serums*, such as Anti-Streptococcus and Anti-Gonococcus, in the preparation of which unfiltered cultures are used. Serums are usually injected in the flank or between the shoulder blades, the skin having previously been cleansed and the syringe carefully sterilized. Cases are on record where they have been given intravenously with normal saline solution and also per rectum.

"A *vaccine* is a finely divided suspension of killed cultures of a microorganism which is injected directly into the human subject. The object is to stimulate the individual to elaborate his own antibodies, which results in increased resistance to the ravages of bac-

terial infection. Vaccines are of two kinds—(a) *Autogenous*—prepared from the organism isolated from pathological material taken from the patient. (b) *Stock* prepared from virulent cultures of the organism, isolated from other cases of similar bacterial origin. Vaccines are administered by subcutaneous injection by means of an all-glass hypodermic syringe. The site of injection may be the flank, thigh, shoulder, or back. The skin is first sterilized by a pledget of cotton wool saturated with a suitable antiseptic, *e.g.* lysol.

"Briefly, the difference is that with a serum the opposing influence to the toxins is produced outside the human body, while with the vaccine it is produced inside and the degree of immunity conferred is greater with the latter than the former. It should also be noted that the dose of a serum is much higher, from the standpoint of the amount of fluid injected, than in the case of a vaccine. With the former the dose usually ranges from 10 c.c. to 50 c.c., while with the latter it is, as a rule, not more than 1 c.c." (*Holland's Pharmacy Handbook.*)

THERAPEUTICS.

1. *Flexible collodion* is used as a protective application, also to prevent bedsores, seal wounds, close punctures made by aspirators. *Cantharidel collodion* is used as a blistering agent.

2. *Boric acid* is a feeble disinfectant; in dilute solution it is antiseptic and soothing to mucous membranes; it is used as a dusting powder and in lotion and ointment in cases of ulcers, eczema, wounds, burns; in cystitis it may be used to wash out the bladder; it is also used as a disinfectant in conjunctivitis.

3. *Salicylic acid* is used externally as an antiseptic; internally, it is given for rheumatism, migraine, gout, sciatica, cholelithiasis. It is a specific for rheumatic fever. It is generally given in the form of sodium salicylate, but the lithium, ammonium, and strontium salts are also used.

4. *Sodium bicarbonate* is an odorless white powder, with a salty taste, soluble in 12 parts of water, insoluble in alcohol. It is used as an antacid, antipruritic, and analgesic; internally, it is sedative to the stomach, but in large doses it stops the gastric digestion. Given after meals it relieves hyperacidity of the gastric juice. It is *incompatible* with acid substances, heavy metals, and alkaloidal salts.

5. *Spiritus ætheris nitrosi* is a transparent liquid with a peculiar penetrating odor and a sharp and sweetish taste; it is inflammable. It is used as a diffusible

stimulant; it is also diaphoretic and diuretic and slightly antipyretic. Dose 15 to 60 minims.

6. *Ethyl chloride* is a gas at normal temperature and pressure, but it is usually supplied condensed into a liquid which is volatile, colorless and inflammable. It has a pleasant ethereal odor. It is used as a general anesthetic in short operations where ether is not desirable. It is not so safe as nitrous oxide, and is followed by headache and vomiting. It does not relax the muscles. It is said to give rise to erotic sensations.

7. *Alumen* is alum, a crystalline solid, of sweet and astringent taste, and acid reaction; soluble in about ten parts of water, freely so in glycerin, insoluble in alcohol. It is used as an astringent and styptic, and is useful in stopping bleeding from the nose, gums and superficial cuts. The *exsiccated alum* absorbs more moisture, and so is somewhat caustic as well as more powerfully styptic, and has been found useful in bleeding tooth cavities, hemorrhoids, and soft corns. Internally alum is used as an astringent mouth wash or gargle; also as an emetic.

8. *Arsenic trioxide* is antiseptic, irritant and caustic; it causes inflammation, severe pain and necrosis of tissue; it is used as an aid to digestion, in dyspepsia, in the vomiting of alcoholism or pregnancy; in anemia and leukemia it increases the number of the red cells; it is a general tonic and improves the appetite, digestion, bodily vigor and body weight. The *liquid preparations* are: Liquor acidi arsenosi, liquor potassii arsenitis, liquor sodii arsenatis, liquor arseni et hydrargyri iodidi. All of these liquid preparations (except the liquor potassii arsenitis) can be administered with acids.

9. *Hexamethylenamine* is a crystalline solid without odor, and of a sweetish taste. It is readily decomposed by acids and by heat, is insoluble in ether, slightly soluble in alcohol and in water. It is used in infections of the genitourinary tract, bacteriuria, typhoid, infections of the gall-bladder and in cerebrospinal meningitis. Its action is due to the splitting up of the compound, and the release of formaldehyde. The danger of large doses lies in the fact that the patient may suffer from frequent micturition, hematuria, pain in the bladder, irritating urine; sometimes the kidneys may be irritated; headache, skin eruption and gastric irritation may also follow large doses.

10. ℞ Liquoris potassii arsenitis ℥jss.
Sodii salicylatis ʒv.
Glycerini, ℥j.
Aquæ menthæ piperitæ q.s. ad ℥iv. M.

Sig.: Take one teaspoonful in water, gradually increasing to a dessertspoonful, after meals.

This prescription may be used for cases of diabetes mellitus.

PATHOLOGY.

1. *Infective granulomata* are inflammatory new growths due to protozoa, bacteria or parasites. They are found in tuberculosis, lupus, syphilis, leprosy, glanders, and actinomycosis.

The *tubercle* is a mass of new formed connective tissue cells, consisting of three layers: (1) lymphoid cells externally, (2) epitheliod cells, in the middle, and (3) giant cells in the center; the tubercle bacilli may be found in (2) and (3).

2. *Teratomata* are "tumors which have a tendency to the formation not only of irregular cell masses but also of fully formed organs, such as brain, teeth, skin, hair, bone, or secreting glands. Such growths may be due to the development of two germinal areas on one germinal vesicle, giving rise to double monsters, one of which undergoes inclusion in the other—fetal inclusion. They may result from the displacement of totipotential cells—those capable of giving origin to an individual—which become included in the growing organism. These cells may develop early, and grow elaborately, giving rise to inclusions recognizable at birth. They may lie latent and at a subsequent time grow actively as abdominal inclusions, teratomata of the genital glands, and certain mixed tumors. *Dermoid cysts, ovarian dermoids* are the most common of the teratomata. The cyst cavity is lined by squamous epithelium, in which are found sweat and sebaceous glands. Within the cavity is usually a varying amount of fatty material in which are masses of hair. In the wall of the cyst are found masses of bone to which teeth, usually but poorly formed, are attached. In some instances the extremities and genitalia have been seen. Somewhat similar growths may be found in those parts of the body where fetal clefts have united and in the median fissures of the body. There is another type, the *sporadic teratomata*, which grow in regions bearing no relationship to the fissures, to the poles of the body, or to the generative glands, as in the anterior mediastinum and the abdomen. These are probably due to the development of a misplaced totipotential cell. They generally consist of tissue from all three germinal layers. Sometimes the tissues are of adult appearance and of limited growth. More frequently they appear

about puberty, grow rapidly, and tend to form secondary tumors."—(McConnell's *Manual of Pathology.*)

3. *Ingrowing toenail.* "This is more accurately described as an overgrowth of the soft tissues along the edge of the nail. It is most frequently met with in the great toe in young adults whose feet perspire freely, who wear ill-fitting shoes, and who cut their toenails carelessly or tear them with their fingers. Where the soft tissues are pressed against the edge of the nail, the skin gives way, and there is the formation of exuberant granulations and of discharge which is sometimes fetid. The affection is a painful one, and may unfit the patient for work."—(Thomson and Miles' *Manual of Surgery.*)

4. *Anaerobic bacteria* are such as either cannot exist in the presence of oxygen or such as find the presence of oxygen injurious to their growth. There are two classes: 1. Obligatory anaerobes, which do not grow except in the almost complete absence of free oxygen; example, the bacillus of tetanus. 2. Facultative anaerobes are those which can thrive in either the presence or the absence of oxygen; example, the bacillus of typhoid.

5. *Keloid tissue* is a tissue of fibrous formation which occurs in scar tissue. It is characterized by somewhat luxuriant growth, and is not confined to the site of the original injury and scar formation. It is generally smooth, and is most often found in negroes.

6. *Secretion* is the process by which certain organs (glands and membranes) separate from the blood certain constituents which are further elaborated and serve some further office in the economy.

Excretion is a similar process by which there are removed from the blood waste materials, and products of no further use to the body, and which if retained would be injurious.

Transudate is a fluid which is found in the interstices of the tissues and which has passed through the walls of the blood vessels. It contains very few cellular elements. A transudate which is the result of inflammation is called an *exudate.*

7. *Sensitization* is the rendering of a cell liable to destruction by a complement, through the action of a specific amboceptor.

8.

SARCOMA.	CARCINOMA.
Origin; entirely mesoblastic (Connective-tissue type).	Epiblastic and hypoblastic (Epithelial-tissue type).

SARCOMA.	CARCINOMA.
Stroma; intercellular. Rarely forms alveoli.	Vascular connective tissue, which surrounds and forms the walls of the alveoli; these communicate with one another, and contain masses of epithelial cells.
Cells; granulation tissue or embryonic connective-tissue cells; shape and size vary.	Epithelial cells contained within alveoli; shape and size vary.
Intercellular substance; may be present.	Absent, or merely fluid.
Vessels; embryonic in character. They are in direct contact with, or may be formed by, the special cells, slightly modified, of which the tumor is composed.	Well developed; entirely contained within the connective tissue stroma, and supported by the walls of the aveoli. Seldom in contact with the cells.

—(Coplin's *Pathology.*)

9. The *beef tape-worm* or *Tænia saginata* or *Tænia mediocanellata* is from 10 to 30 feet in length, and has several hundred proglottides. It has a rounded or oval-shaped head which measures about 1/10 of an inch, and has four strong and prominent suckers, but no hooklets—whence the term "unarmed tapeworm"; the neck is short and thick and the segments are larger, stronger, and thicker than those of the *Tænia solium.* The best way to distinguish a segment of *Tænia saginata* from that of *Tænia solium* is to count the number of lateral uterine branches.

In the *Tænia saginata,* there are 15 to 30 of them; in the *Tænia solium* there are 5 to 10.—(Hughes' *Practice of Medicine.*)

10. *Phenomena and signs of death,* are: The complete and permanent cessation of circulation and respiration, rigor mortis, loss of body heat, pallor of the body, putrefaction.

For methods of applying the tests, see a good textbook on medical jurisprudence.

Rigor mortis is the condition of rigidity or contraction into which the muscles of the body pass after death. It begins at a period varying from about 15 minutes to about 6 hours. It usually begins in the muscles of the eye, neck, and jaw; then the muscles of

the chest and upper extremity, and last of all those of the abdomen and lower extremity are affected. It passes off in the same order in about 24 hours. It is said to be due to the coagulation of the muscle plasma.

PRACTICE OF MEDICINE.

1. *Diseases liable to occur in the right inguinal region:* Appendicitis, inguinal hernia, psoas abscess, intussusception fibroid tumor, fecal impaction, cancer of cecum or ascending colon, floating kidney, cyst or abscess or broad ligament or ovary, retroperitoneal sarcoma.

2. *Signs and symptoms of floating kidney:* There may be a dragging pain in the loin, which is made worse by exertion; there may be paroxysmal crises of pain accompanied by rigor, vomiting and collapse (Dietl's crises); neurasthenia, and dyspepsia may be present; the kidney may be palpated in the abdominal cavity and may be replaced. There may be no symptoms at all.

3. The *cause of malaria* is the *plasmodium malariæ*, which is inoculated in man by the anopheles mosquito. There are three varieties of parasite: 1. The quartan parasite (*Plasmodium malariæ*); 2. the tertian parasite (*Plasmodium vivax*); and the æstivo-autumnal parasite (*Plasmodium falciparum*).

4. *Eruptive fevers, with period of incubation* (approximate): Typhoid, five to twenty-one days; typhus, three or four to fourteen days; measles, one to two weeks; German measles, five to twenty days; scarlatina, three to seven days; smallpox, ten to fourteen days; chickenpox, fourteen or fifteen days; erysipelas, three to seven days.

5. *Hemophilia* is a condition characterized by a tendency to severe hemorrhage, sometimes almost uncontrollable, and following any slight injury or abrasion. Heredity is a common factor, and males are most commonly affected, but the disease is transmitted through females. *Treatment* consists in protection from injury or operation; adrenalin, calcium lactate, ergot, ferric chloride, potassium chlorate, ice, tannic acid, fibrin ferment, and other remedies have been suggested; transfusion of blood may be necessary.

6. A *delusion* is a belief in something which has no real existence, but is purely imaginary, and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression, received through one of the senses. An *hallucination* is the same as an illusion, but without any material basis.

If an individual believes himself to be made of glass,

and is afraid of being touched lest he be broken, he is suffering from a *delusion*. If the whistling of the wind is mistaken for a voice telling a person to do a certain thing, that would be an *illusion*. If a person fancied he heard a voice when there was nothing at all to be heard, that would be an *hallucination*.

Epistaxis is bleeding from the nose.

Hemoptysis is the spitting of blood.

Hematemesis is the vomiting of blood.

7. The *symptoms of diabetes mellitus* are: Weakness, excessive thirst, frequent urination, and increase in the amount of urine voided, the presence of glucose in the urine. Hyperglycemia is a feature of the disease; pruritus, emaciation, a dry and harsh skin, lost or diminished knee-jerks, coma, and air hunger are often present. The urine also contains acetone, oxybutyric acid, and diacetic acid, sometimes albumin and casts, and an increased output of nitrogen.

The *treatment* is mainly *dietetic*. "The indications are to maintain nutrition, to increase the tolerance for carbohydrates, to lessen hyperglycemia, and to prevent or diminish acidosis. In mild cases (except in childhood and adolescence) the diet may contain the full amount of carbohydrate that can be tolerated without causing glycosuria, but a week of strict (carbohydrate-free) diet should be interposed every four or five weeks. In severe cases with acidosis, the diet should have a low nitrogen content and contain the carbohydrate best tolerated (oatmeal, potato, fruit) in such quantity that the glycosuria is kept at a minimum and the body weight is not reduced. Frequent periods of strict diet must be introduced, however, to lessen the hyperglycemia, and during these periods from ½ to 1 ounce of sodium bicarbonate should be given daily to control the acidosis. In cases requiring rigorous treatment alcohol in moderate amounts, in the form of whiskey, brandy, or white wine, is useful in supplying additional energy and aiding in the digestion of fats. *General hygienic measures* are of great importance, especially the prevention of mental and physical overexertion, worry, and excitement. A moderate amount of regulated exercise is beneficial in mild cases, but considerable rest is absolutely necessary in severe forms of the disease. *Drugs.*—Tonics, like arsenic, iron and strychnine are often useful. Opium proves efficacious in some cases. It is best given in the form of codeine (½ grain three or four times a day). Salicylates have been strongly recommended. Bromides are serviceable in subduing nervous manifestations. Alkaline carbonates and alkaline mineral waters have

long enjoyed a reputation. Upon the recognition of the early signs of *coma*, a moderate amount of readily digestible carbohydrate should be added to the diet. Absolute rest should be enforced, saline laxatives and diuretics (theobromine caffeine), should be administered, and large doses (1 to 2 ounces) of sodium bicarbonate should be given daily. Developed coma is rarely relieved by *intravenous* injections of 4 per cent. solution of sodium carbonate (a liter, if possible, and repeated if necessary at end of six hours)."—(Stevens' *Practice of Medicine.*)

8. *The causes of chronic interstitial nephritis* are practically the same as for arteriosclerosis. The disease may be traced to chronic alcoholism, gout, chronic lead poisoning, syphilis, and diabetes. Age is, of course, a factor; so too, are overwork, high living, and worry. *Complications:*—Bronchitis, pleurisy, pneumonia, pericarditis, endocarditis, and other inflammatory conditions, edema, and various hemorrhages.

9. *Empyema* is generally secondary to pneumonia, tuberculosis, scarlet fever, or other exanthem, suppurative inflammations, or traumatism. The pneumococcus, streptococcus, and staphylococcus are the bacteria most frequently found. The condition is diagnosed by finding the symptoms of fluid in the pleural cavity; this is withdrawn by a needle and on examination is found to be pus; a leucocytosis is also present.

The physical signs are those of fluid in the pleural cavity; that side does not move well, the percussion note is dull, there is absence of breath sounds, vocal fremitus and resonance are diminished. Let alone, an empyema may burst through an intercostal space, usually the fifth. The lung is collapsed in extent according to the amount of pus. The pleura, at first covered with lymph, soon becomes covered with layers of granulation tissue, the deeper part of which is converted into fibrocicatricial tissue, and the lung itself also undergoes some fibroid change. If the pus is let out early the lung and pleura soon expand, but if allowed to go on the infiltration of the lung and the density of the scar tissue covering it hinder expansion. Nature attempts to remedy this in various ways. (1) The other lung expands and pushes the heart over to the opposite side; (2) the chest wall falls in, the intercostal spaces are obliterated, and the spine is curved, with its concavity toward that side; (3) the abdominal viscera are pushed up; and (4) exuberant granulations form on the pleura. If a cavity still remains an operation is necessary.

Symptoms: Fever, sweats, chill, diminished breath

sounds and vocal fremitus, impaired mobility of chest, dullness on affected side, heart displaced to opposite side, leucocytosis.

Treatment: Aspiration, drainage, irrigation, resection of ribs (Estlander's operation), or resection of chest wall (Schede's operation). Operation of some sort is the only treatment.

10.

GOUT.	RHEUMATOID ARTHRITIS.
Frequently hereditary.	Not so.
Causes are chiefly dietetic.	Causes chiefly nervous.
Affects males and the better classes most frequently.	Affects females and lower classes most frequently.
Begins in the big toe and extends to other toes; it is unilateral.	Begins in the fingers which point to the ulnar side; develops in symmetric order.
Attacks are periodic.	More steadily progressive.
Deformity due to tophaceous deposits.	Deformity due to exostosis and ankylosis, and more marked.
Uric acid in excess in the blood.	Not so.
Complications (nephritis, arteriosclerosis).	Very rare.

—(Anders' *Practice of Medicine.*)

OBSTETRICS AND GYNECOLOGY.

1. A *trefoil placenta* is a malformation of the placenta in which there are three distinct portions of that organ, more or less intimately united.

A *horseshoe placenta* is a placenta which has a crescentic form, seen in cases of placenta prævia when the placenta is found around the internal os; it is also found in some cases of twin pregnancy where the two placentæ are joined by a strip of placental tissue.

A *succenturiate placenta* is one which, in addition to the usual placenta, has one or more subsidiary lobes.

Battledore placenta is one in which the cord is implanted in the margin instead of in the center.

2. *Caput succedaneum* is an edematous swelling developed on the presenting part in the course of birth. It is formed by the serosanguineous infiltration of the connective tissue of the presenting part and is due to edema in the part which is not compressed by the maternal structures.

3. *To protect the perineum:* The patient should be restrained from bearing down unduly; extension of the head must be retarded, and the central part of the occiput must be allowed to be born first; pressure must be made with the hand between the coccyx and the anus; when the perineum has had time to stretch, extension and expulsion are allowed; after the birth of the head care must be taken to see that the perineum is not torn by the birth of the shoulders.

4. *Management of twin labor complicated by interlocking.* "If there is marked delay in the delivery of the first twin, some form of interlocking should be suspected and under anesthesia the hand should be passed into the uterus and the exact conditions determined. If both twins present by the vertex and the second has become impacted in the neck of the first child, an attempt should be made to push up the second head and deliver the first child with the forceps. Occasionally, the best procedure is to deliver the second head past the first, always remembering that craniotomy on one child in the hope of saving the other may be good obstetrics. If the first child presents by the breech and its body is born while its chin is locked with the chin of its fellow, an attempt should be made to unlock the heads, but if this attempt fails it is usually wise to decapitate the first child, pushing up its head, and then to deliver the second child, finally delivering the head of the first. The reason for the wisdom of this course lies in the fact that with failure of the attempt to dislodge the second child's head, the life of the first child usually ceases during the endeavor to extract the second past it, and the second child's life is much more likely to be saved if the canal is cleared of the first child. If the first child lies transversely, and the second child sits astride with feet in the vagina the best procedure is usually to perform version and extraction upon the first child, although each of these cases presents a problem of its own and must be dealt with individually, some cases justifying cesarean section and some craniotomy."—(Cragin's *Practice of Obstetrics.*)

5. PROLAPSED CORD. *Danger:* Compression causes death of the fetus. *Treatment of prolapsed funis* consists in : (1) Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor;

(4) speedy delivery, by forceps or podalic version.

6. PHLEGMASIA ALBA DOLENS is a form of manifestation of puerperal sepsis in which there is a thrombosis of the iliac or femoral vein. Sometimes it occurs after a uterine phlebitis, in which clots are carried from the uterine sinuses to the hypogastric veins, where they cause obstruction to the blood flow in the crural veins. The trouble may also begin as a crural phlebitis. It is thus due either to cellulitis or to thrombosis. It usually appears about the third or fourth week of the puerperium. *Symptoms:* Irregular chilliness and malaise, pain in leg and abdomen, rigor and swelling of leg, fever, skin is white and tense, and the vein feels hard. *Treatment:* Rest in bed, support patient's strength, relieve pain, and apply lead and opium wash to take down the inflammation.

7.

BREECH.	FACE.
Abdominal palpation will reveal the movable head above, upon which cephalic ballottement may be practised.	Abdominal palpation will show the breech and extremities above.
The anus may be distinguished by the absence of bony ridges, by its small size, and by the sphincteric action.	The mouth may be recognized by its large size, by the presence of the hard bony alveolar ridges, and by the abscence of sphincteric action.
There is a discharge of meconium.	No meconium is discharged.
The sharp spinous processes of the sacrum may be felt.	There are no corresponding processes to be detected.
There are no other prominent bony structures to be distinguished.	There is to be noted the presence of the hard orbital borders and the smooth, broad forehead.

—(Dorland's *Obstetrics.*)

8. A *face presentation* is hard to deliver, because, unless the head is fully extended large diameters engage (*e.g.* vertico-mental diameter, of about 4½ inches); further, the face bones do not mould, the membranes rupture early, and the face is a bad dilator.

9.

RETROFLEXED GRAVID UTERUS.	PREGNANCY WITH OVARIAN TUMOR.
Symptoms of incarceration early.	Absent or very late.
Bladder symptoms pronounced.	Absent or inconsiderable.
Tumor symmetric and soft all over.	Usually asymmetric, hard, and tense all over or in places.
No other tumor above the pelvis.	Often can feel pregnant uterus above inlet and to one side.
Moving the cervix imparts impulse to the tumor.	The upper tumor (uterus) can be moved independently of tumor.
The fornices are flattened, at least not drawn up.	The fornices are drawn up high, sometimes even above the pubis.
The tumor in the cul-de-sac may contract.	Never.
May distinguish the fetal parts.	Never.

—(De Lee's *Obstetrics.*)

10. SALPINGITIS. The usual cause is septic infection, or gonorrhea. *Diagnosis:* A dragging sensation in the neighborhood of the affected tube; colicky pain, which is increased on exertion or even on standing; abdominal tenderness; menstrual disorders, as amenorrhea, metrorrhagia, dysmenorrhea, menorrhagia; dyspareunia; there may be septic symptoms and peritonitis; sterility generally ensues. On examination there will be found a fullness in Douglas' pouch and one or both lateral fornices; in these latter will be felt either the tubes, distorted and possibly adherent, or a sausage-shaped tumor, which is very painful; the uterus is retroverted or retroflexed, and may be bound down by adhesions; there may be an intermittent expulsion of pus accompanied and preceded by a burning pelvic pain.

Treatment: Rest in bed, hot vaginal douches, saline purgatives, liquid diet, morphine (if necessary) for pain, removal of pathological conditions and complications; radical operation (salpingectomy, or salpingo-oophorectomy) may be necessary.

SURGERY.

1. *Chronic suppuration of the middle ear* is due to

the permanent lodgment of staphylococci in the acutely inflamed middle ear. This is usually brought about by improper (*i.e.*, excessive) treatment of acute otitis media. *Treatment:* "Cotton must never be worn in the discharging ear. The discharge must be mopped out, but if very thick and copious, syringing by means of sterile water or sterile water containing salt (gr. 5-℥ 1) or carbolic acid (1:40), once or twice in 24 hours in bad cases is permissible. After mopping the ear, 10 drops of an antiseptic solution may be instilled. Formalin solution (1:1000-1:2000), carbolic acid solution (1:40), or, if granulations are present, absolute alcohol, may be dropped in and allowed to remain for a few minutes, and then turned out into a towel. This treatment should be continued once or twice a day in very bad cases, and less often when the discharge decreases. If, after several months, improvement does not take place removal of the ossicles under general anesthesia may be necessary."—(*Pocket Cyclopedia*).

2. GONORRHEAL CONJUNCTIVITIS. *Symptoms:* Swelling and redness of the eyes, the presence of a discharge which soon becomes purulent, the conjunctiva of the lids becomes thickened, the eyelids are edematous, pain is severe, and there is some fever.

Diagnosis is made by the history, the symptoms, and finding the gonococcus in the purulent discharge.

Management: Protect the sound eye. Wash the eye carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped onto the cornea every night and morning. The eyes must be covered with a light, cold wet compress. The patient must be isolated, and all cloths and compresses used must be burned. In adults the irrigation must be frequent, about every half hour or hour.

3. PHLEBITIS. *Symptoms:* A hard, painful, cord-like swelling forms over the vein. Skin over this is dusky, congested, and edematous. If the vein is superficial there are no other signs. If it is the main deep vein of the limb, massive solid edema occurs, with considerable lymphatic engorgement (white leg). Superficial veins enlarge in order to carry on the collateral circulation. Fever, with rigors, occurs, and is proportioned to the infectivity of the process. Abscesses develop round an infective phlebitis. *Complications:* Cardiac or pulmonary embolism follow the dislodgement of a thrombus. Pyemia results from the disintegration of a septic thrombus. Permanent edema with varicose veins is

left in the leg when the deep femoral is blocked. *Treatment:* Rest and elevation in bed for six weeks. Belladonna applications for pain. Excision of the veins in recurrent superficial phlebitis. Incision, removal of clot with proximal ligature in infective phlebitis, *e.g.*, in the juglar vein following acute mastoiditis.—(*Synopsis of Surgery.*)

4. *Pott's disease* is tuberculosis of the spine. The *symptoms* are pain, tenderness on pressure, rigidity of the back, and a sense of weakness, which may usually be recognized by the child's actions. When suppuration occurs, the pus may enter the sheath of the psoas, destroying the muscle, and presenting in the iliac fossa or groin as an iliac or psoas abscess; or it may pass backward through or external to the quadratus lumborum, and point in the loin, when it is known as lumbar abscess. In the cervical region retropharyngeal abscess may occur. Spinal paralysis may come on at any time and myelitis develops in the latter stages. *Treatment:* "Rest in bed, using sand bags as splints, is the first consideration. After the acute symptoms have subsided a Thomas splint, Sayre's plaster cast, or Cocking's felt jacket may be applied to the back and the patient gradually allowed to move about. *To apply the plaster-of-Paris cast,* the patient should be suspended so that the heels are just off the ground. A skin-fitting vest is then applied to the trunk, under which a stomach-pad is inserted, which should be removed after the plaster has become dry. Plaster bandages should now be applied in the usual manner, extending from the level of the axilla to just below the crest of the ilium. When the case is dry, it may be divided down the front and perforated, so that it can be laced up or removed at any time. Abscesses should be opened early and freely, and injections of iodoform emulsion will be found very beneficial. Laminectomy is sometimes advisable."—(*Pocket Cyclopedia.*)

5. In *fracture of the surgical neck of the humerus,* the head of the humerus will be found in the glenoid cavity, but it will not rotate with the shaft; the arm will appear shorter; and crepitus and abnormal mobility will be elicited unless there is impaction.

In *dislocation of the shoulder joint,* the glenoid cavity will be empty, and the head of the bone will be found in an abnormal position; the arm will appear longer; there will be no crepitus, and no abnormal mobility.

Recent dislocation of the shoulder. Kocher's method of reduction is: to flex the forearm, press the elbow to the side, rotate the arm outward. Bring the arm for-

ward and upward to a right angle with the body, then rotate inward, while the elbow is brought down over the body so that the fingers sweep the opposite shoulder.

6. *Ischiorectal abscess. Causes:* Infection of the ischiorectal tissues with pyogenic microorganisms; skin infection; infection from rectum; trauma. *Symptoms:* Severe and throbbing pain in perineum and round anus, great tenderness, edema, redness of skin, fever, and signs of pus formation. *Treatment:* Free incision, opening up every part of the abscess; do not wait for fluctuation. Irrigate and drain.

7. "*Rodent ulcer* is a carcinoma beginning in sebaceous glands. It generally occurs in patients over forty, and is of very slow growth. It begins as a smooth, rounded knob in the skin about the nose, eyelids, orbital angles, or cheeks, slowly increasing in size. In time ulceration occurs. The ulcer has a smooth, depressed base covered with ill-formed granulations, and bounded by a slightly raised, indurated, rolled-over edge. There is little discharge if sepsis is prevented, and little or no pain. The lmpyhatic vessels and glands are not affected, and dissemination does not occur. The ulcer spreads and destroys surrounding structures; even bone is not spared, so that the brain may ultimately be exposed. Microscopically the growth resembles epithelioma, but the cells are never of the 'prickle-cell' type, and no 'cell nests' are found. The cell columns spread more laterally than deeply, and there is less small-celled infiltration around. *Treatment:* Free incision, allowing a margin of ½ inch all around. If the situation or extent do not allow of this, Röntgen rays should be used for ten minutes daily till healing occurs."—(*Aids to Surgery.*)

8. "In the treatment of compound fractures the main object is to render the wound aseptic and to give efficient exit to the discharges. For this purpose the patient should in all cases be anesthetized, the limb shaved, and thoroughly purified, and the wound enlarged and thoroughly washed out with some reliable antiseptic. It may be advisable to excise torn and dirty fragments of skin, muscle, and tendon, especially when dirt has been ground into them. Loose fragments of bone are removed and portions denuded of their periosteum may be taken away lest necrosis should ensue; where fragments retain any considerable connection with the soft parts they may be left without fear. When a sharp end of one of the fragments is protruding through a small opening in the skin it is first purified thoroughly before attempting its reduction and then replaced, after en-

larging the wound in the skin, or a portion sawn off. Hemorrhage is dealt with in the usual way, and the fragments are placed as nearly as possible in their normal position. If the fragments can be brought accurately into position it is well to fix them by some mechanical appliance; but where the ends of the bone are much comminuted the small portions must be arranged in position as well as possible, and no attempt made to wire them. A good-sized drainage tube is inserted, and, if need be, counter-openings are made; the external wound is closed or not, according to circumstances, and dressed and suitable splints are then applied. Under such a régime the majority of cases do well. Immovable apparatus may be used after a time, windows being left in the plaster casing to allow wounds to be dressed." —(Rose and Carless's *Manual of Surgery*.)

9. ILEUS. *Varieties, with causes:* 1. *Acute*, caused by strangulation by bands and through apertures, kinking, volvulus, foreign bodies, and intussusception. 2. *Chronic*, caused by stricture, fecal accumulation, and tumors (either within or outside the bowel). *Treatment of the acute variety:* "The only thing that can give the patient the chance he ought to have is immediate operation. It is advisable to wash out the stomach before the operation, so that intestinal contents may not be vomited and inhaled during operation.

"Three objects are aimed at: (1) To empty the distended bowel above the obstruction; (2) to relieve the obstruction; (3) to treat the strangulated intestine. In cases that are almost moribund, the abdomen should be opened with cocaine or eucaine anesthesia; a distended coil is pulled out and tapped, a Paul's tube being subsequently tied in. The peritoneal cavity is protected with gauze packing during these manipulations. The bowel is stitched to the abdominal wound after the feces and flatus have drained away. No attempt at relief if the obstruction can be made in these cases till a later date, and, of course, a high death-rate must be expected.

"In less severe cases the abdomen should be opened in the mid-line below the umbilicus, and a systematic search made for the cause of the obstruction. The hernial orifices are first examined, then the cecum. If the cecum is distended, the obstruction lies below it; if collapsed, above it. In the former case the sigmoid should next be examined. If collapsed, the colon must then be traced backwards till the obstruction is found. If the cecum is collapsed, the intestine must be pulled out a foot at a time and examined, beginning with the ileum, and replacing it as each part is done with. If

the intestine is much distended, several coils may be tapped and emptied, to facilitate the search.

"Bands and adhesions should be divided between ligatures. A volvulus should be untwisted if possible. If it tends to rewind, the mesosigmoid must be stitched to the abdominal wall. If it cannot be untwisted owing to adhesions, or if the mass is gangrenous, it must be resected if the patient can stand so severe an operation. If not, an artificial anus must be made both in the drawn-out loop and in the colon above it.

"Foreign bodies should be pushed back to a healthy part of the intestine, and removed through an incision at the antimesenteric border, which is afterwards stitched up."—(*Aids to Surgery.*)

10. *Carcinoma of the breast:* "Scirrhous carcinoma is usually met with in women between the ages of thirty-five and fifty, and it often begins while the patient is still menstruating regularly. It sometimes occurs in patients below thirty. The most common site is the upper and outer quadrant of the breast, but it may occur in any part of the gland. Sometimes there is more than one nodule in the breast. In its early stages the condition is quite painless, and the existence of the tumor is usually discovered accidentally. In some cases indrawing of the nipple or dimpling of the skin over the breast first attracts attention. It is often noticed that there is a difference in the level of the two nipples, that of the affected breast being at a higher level than the other (Watson Cheyne). As the disease progresses the patient experiences a dull, aching pain, with occasional sharp twinges shooting through toward the shoulder, up into the neck, or down the inner side of the arm. On palpation, a more or less circumscribed and fairly well-defined tumor of stony hardness may be felt in the substance of the breast. Not being encapsulated, it cannot be moved apart from the breast. When firmly pressed against the chest wall with the flat of the hand the tumor becomes more evident, and its stony hardness is fully appreciated. The skin over the growth may for a long time remain free, but, as the disease progresses, it becomes tacked down, and is later dimpled by contraction of the suspensory ligaments of Cooper. When the skin becomes invaded by the tumor it assumes a characteristically coarse and indurated appearance, aptly compared to that of the skin of an orange or to pig's skin. When the tumor is near the center of the breast, it causes retraction of the nipple by dragging on the large ducts. It cannot be too strongly emphasized that the presence of all or any of

these symptoms is not necessary for the diagnosis of cancer, and that when there is any doubt the patient should be given the benefit of an exploratory operation." —(Thomson and Miles' *Manual of Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

MASSACHUSETTS STATE BOARD OF REGISTRATION IN MEDICINE.

ANATOMY AND HISTOLOGY.

1. What anatomic structures are involved in the problem of fallen arches?
2. Describe the semicircular canals.
3. Give an outline of the regional anatomy of the neck.
4. Give a description of heart muscle.
5. Describe the hip joint.
6. What bones are involved in so-called Colles' fracture?
7. Describe the pancreas.
8. Give the distribution and arrangement of the blood-vessels of the kidney.
9. Describe the patella, giving its relations and attachments.
10. What are sesamoid bones and where found?

PHYSIOLOGY AND HYGIENE

1. What is the function and appearance of lymph?
2. What dietary conditions influence favorably or unfavorably the development of the teeth?
3. Describe and give the functions of the cellular elements of the blood, excepting the red blood-cells.
4. How and why do changes of temperature influence the functions of the kidneys?
5. What insects are dangerous to health? How should they be dealt with?
6. What changes result in muscle tissue following a diminished blood-supply?
7. What happens if the thyroid gland is removed?
8. What part of the brain is affected when a patient has aphasia?
9. How is acidity of the stomach maintained?
10. Describe the method of counting blood-cells.

PATHOLOGY AND BACTERIOLOGY.

1. Explain the phenomena of active and passive hyperemia.
2. A patient has an acute septicemia. What changes would be found in parenchymatous organs?
3. A patient dies of pyemia. Describe the kidney in such a case.

4. A person dies of abscess of the liver. Explain what may have caused this condition.
5. What would cause thrombosis of the mesenteric vessels?
6. Give the pathology of the different common forms of cystitis.
7. Give the pathology of elephantiasis.
8. Describe the blood in a case of myelogenous leucemia.
9. Give the pathology of malaria.
10. Describe the hookworm.

DIAGNOSIS AND THERAPEUTICS.

1. Mention three of the most frequent complications which may arise during an attack of lobar pneumonia. Give treatment for one of them.
2. What complications may arise in whooping-cough? What means should be adopted in the treatment of the disease to prevent them?
3. Define and give etiology of Ludwig's angina (cellulitis of the neck).
4. Give the pathognomonic symptom or symptoms, if such there be, of malaria. Also your treatment for that disease.
5. Write a page on the causes, symptoms, and treatment of exophthalmic goiter.
6. Give description, causes, and treatment of a case of urticaria.
7. Patient, a man 44 years of age, began a year ago with frequent attacks of vertigo, persistent and increasing headache, difficulty of vision and speech, convulsions without loss of consciousness, and at times nausea and vomiting. What is your diagnosis?
8. Outline a course of treatment for a case of gout.
9. Give causes, symptoms, and treatment of herpes zoster.
10. What indications or symptoms would call for the administration of ergot? If your practice does not include the use of drugs, what methods would you employ in place of the drug?

OBSTETRICS AND GYNECOLOGY.

1. Why should the blood-pressure be taken during pregnancy?
2. How should a pregnant woman be advised concerning the care of her digestive organs during pregnancy?
3. How would you diagnose a twin pregnancy at the eighth month?
4. Can you always make a differential diagnosis between uterine fibroma and pregnancy? If so, how?

5. If a hand is found presenting during labor, what should be done?

6. What would lead you to suspect a dead fetus in utero at the eighth month? What questions would you ask the parents, and what advice would you give?

7. What is the explanation of pus tubes? Assuming that the patient may not be operated on, what will probably be the future history of such a case?

8. What is the law relating to the care of the eye of a new-born child?

9. Give the etiology and treatment of icterus neonatorum.

10. How do you treat caput succedaneum?

SURGERY.

1. A woman 60 years of age, on rising in the morning, finds that her urine is distinctly bloody. She has no pain. What investigations should be made?

2. A patient has a continued fever lasting two weeks, ranging from 99 in the morning to 101.5 at night. She has two to four loose stools daily. The tongue is coated. Her abdomen is slightly tender to pressure to the left of the bladder region, and below the margin of the ribs 1 inch to the right of the right mammary line there is another tender area with slight resistance. Two years ago she had her breast removed for a so-called fibroid tumor. She has a negative Widal. She has a white count of 15,000. What would you do?

3. What are the indications for splenectomy?

4. What would you do for osteomyelitis of the tibia?

5. What is meant by artificial pneumothorax?

6. Discuss the surgical problem of abscess of the lung.

7. Describe briefly a case of abdominal fat necrosis, and state how it should be treated.

8. Give the etiology of cholelithiasis.

9. Under what circumstances may anastomosis of blood-vessels be employed?

10. A patient has round cell sarcoma of the glands of the neck. What may be done, and what is the probable history following treatment?

PEDIATRICS AND TOXICOLOGY.

1. What standards should be required of milk producers?

2. Give etiology and treatment of cholera infantum.

3. What would indicate a pyloric stenosis in early life?

4. Give your treatment for chorea.

5. What are the dangers incident to removal of tonsils and adenoids?
6. What are the different forms of congenital herniæ; what should be done in each case?
7. What is the cause of hydrocephalus? What treatment would you recommend?
8. Describe a case of toadstool poisoning and give treatment.
9. Differentiate strychnia and belladonna poisoning.
10. Describe clinically and pathologically chronic lead poisoning.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Massachusetts State Board of Registration in Medicine.

ANATOMY AND HISTOLOGY.

1. In *fallen* arches, the following structures are involved: The longitudinal and transverse arches are both flattened. The muscles and ligaments of the sole of the foot are stretched; this includes the calcaneo-cuboid and the inferior calcaneo-scaphoid ligaments, the tendons of the tibialis anticus and posticus, and the flexor longus digitorum and flexor hallucis (and other short) muscles. The astragalus drops, the astragalo-scaphoid joint projects, the sole of the foot is everted, and the tendons of the peronei muscles are rigid.

2. The *semicircular canals* are three arched osseous canals, situated in the internal ear, placed above and behind the vestibule, opening into that chamber by five rounded apertures, two adjacent canals having a common opening. Each canal forms about two-thirds of a circle, and presents at one end a dilated part, the ampulla. Two of the canals are vertical, and the third is horizontal. The superior canal is vertical, and forms a projection on the upper border of the petrous part of the temporal bone. The inner extremity joins the opening of the posterior canal. The posterior canal is vertical, its upper end being joined to the lower opening of the superior canal. The horizontal or external canal is the smallest of the three, and lies horizontally just above the level of the fenestra ovalis.—(*Aids to Anatomy.*)

3. "The *region of the neck* is limited below and in front by the upper margin of the sternum, and by the clavicle on each side, while, behind, there is no sharp

line of demarcation between it and the back. Above it is bounded by the lower margin of the mandible, by lines drawn from the angle of the jaw on each side to the root of the mastoid process, and by the superior curved lines of the occipital bone. The neck region is divided into well-defined anterior and posterior areas by the two sternomastoid muscles. These muscles lie close together at their origin below, but diverge widely when traced up toward their insertion into the mastoid processes and into the superior curved lines of the occipital bone. Below, the clavicular and sternal heads of the muscle are distinct from one another, and are separated by a small depression which extends upward for an inch or more above the clavicle. Higher up, however, they completely fuse into a single belly, the anterior fibers of which are derived from the sternal head, and the posterior of which principally represent the clavicular head. The anterior area of the neck lies in front of these muscles, and is triangular in shape, with the apex below at the suprasternal notch, and the base above extending from one mastoid process to the other. The posterior region behind these two muscles is also triangular in shape, with a blunted apex above at the occipital bone, and with its base below where the neck and back become continuous with one another."—(*Moorhead's Surface Anatomy.*)

4. "The muscular substance of the heart is composed of transversely striated muscular fibers, which differ from those of voluntary muscle in the following particulars, viz.: their striations are less distinct; they have no sarcolemma; they branch and unite by their branches and also at the side with neighboring fibers, and their nuclei lie in the substance and often near the center of the fibers. Moreover, the fibers are composed of a series of short cylindrical cells joined together end to end, each corresponding to one of the nuclei. The lines of junction of these cells may sometimes be seen in longitudinal sections stained with hematoxylin; but they come much more distinctly into view in sections of the fresh tissue stained with nitrate of silver. They appear to be bridged across by fine fibrils."—Schäfer's *Histology.*)

5. The *hip-joint* is an enarthrodial joint, formed by the head of the femur and the acetabulum. The articular surfaces are covered with cartilage. Near the center of the head of the femur is attached the ligamentum teres. The *ligaments* are: (1) The capsular, which embraces the margin of the acetabulum above, and the neck of the femur below. (2) The ileofemoral

or Y ligament, which passes obliquely across the front of the joint, and is attached above to the anterior inferior spine of the ileum, and below to the anterior intertrochanteric line. (3) The ligamentum teres. (4) The cotyloid ligament, which deepens the acetabulum, and bridges over the cotyloid notch, being there called (5) the transverse ligament. The joint has a very extensive synovial membrane. It is capable of the following movements: Flexion, extension, abduction, adduction, circumduction, and rotation.

6. Colles' fracture is a fracture of the lower end of the radius.

7. *Pancreas: Length*, 6 to 8 inches. Consists of a body enlarged to the right at its head, with which the body is connected by a narrow part or neck, and narrowed to the left where it ends as the tail.

Position.—Placed in the epigastic and both hypochondriac regions, directed transversely across posterior wall of abdomen.

Relations of the body:—

In front. Stomach and small omentum.

Behind. Aorta, crura of diaphragm, splenic vein, left kidney, left suprarenal body, and left renal vessels.

Upper border. From right to left; cœliac axis, splenic artery.

Lower surface. From right to left; superior mesenteric vessels, inferior mesenteric vein, transverse colon.

Left end or tail. Touches lower part of anterior surface of spleen.

Right end or head. Embraced by three parts of duodenum, from which it is partly separated, behind by bile-duct, and in front by pancreatico-duodenal arteries. Is covered in front by the lesser sac of peritoneum.

Behind it lies on the first and second lumbar vertebræ, from which it is separated by the crura of the diaphragm, inferior vena cava, superior mesenteric vessels, and portal vein. The superior mesenteric vessels overlap the left end of the head, lying in a groove on this surface.

Duct (canal of Wirsung): extends transversely from left to right, opens into second part of the duodenum in common with the ductus communis choledochus.

Arteries: pancreatic of splenic, superior pancreatico-duodenal of hepatic, and inferior pancreatico-duodenal of superior mesenteric.

Veins: open into splenic and superior mesenteric.

Nerves: from the solar plexus.—(*Aids to Anatomy.*)

8. *Blood vessels of kidney.* "The renal artery enters the kidney at the hilus, and divides into branches that pass toward the cortex, then turn over and form incomplete arches in the region between cortex and medulla. From these arches vessels pass to the surface which are called the interlobular arteries; they give off vessels at right angles, which are the afferent vessels of the glomeruli; a glomerulus is made up of capillaries. From each a smaller vessel (the efferent vessel of the glomerulus) passes out, and like a portal vessel on a small scale, breaks up once more into capillaries which ramify between the convoluted tubules. These unite to form veins (interlobular veins) which accompany the interlobular arteries; they pass to venous arches, parallel to, but more complete than, the corresponding arterial arches; they ultimately unite to form the renal vein that leaves the hilus. These veins receive also others which have a stellate arrangement near the capsule (venæ stellulæ). The medulla is supplied by pencils of fine straight arterioles which arise from the arterial arches. They are called arteriæ rectæ. The efferent vessels of the glomeruli nearest the medulla may also break up into similar vessels which are called false arteriæ rectæ. The veins (venæ rectæ) take a similar course and empty themselves into the venous arches. In the boundary zone groups of vasa recta alternate with groups of tubules, and give it a striated appearance."—(Halliburton's *Physiology.*)

9. The *patella* is a flat, triangular bone situated in front of the knee-joint; it is said to be a sesamoid bone developed in the tendon of the quadriceps extensor. Its anterior surface is convex and shows perforations for nutrient vessels; it is separated from the skin by a bursa. Its posterior surface is smooth and oval-shaped, and has two facets separated by a vertical ridge; these facets articulate with the two condyles of the femur. The superior border gives attachment to the rectus and crureus: the lateral borders give attachment to the vastus externus and vastus internus. The apex gives attachment to the ligamentum patellæ. The anterior surface is covered by the tendon of the quadriceps extensor, which is continuous below with the ligamentum patellæ.

10. Sesamoid bones are cartilaginous in early life, but later become osseous. They are developed in the tendons of muscles at points where these latter are exposed to pressure upon the parts over which they glide. Their function is to increase the leverage of the mus-

cles. The largest sesamoid bone in the body is the patella; others are found in or near the joints of the thumb and great toe, in the tendons of the biceps cubiti, peroneus longus, tibialis anticus, and posticus, gastrocnemius, and gluteus maximus.

PHYSIOLOGY AND HYGIENE.

1. LYMPH. *Origin:* There are two theories as to the formation of lymph: (1) That it is formed from the blood plasma by the processes of filtration, diffusion, and osmosis. (2) That in addition to these, the endothelial cells of the capillaries exercise some influence. *Description:* Lymph is a colorless, albuminous fluid, alkaline in reaction, with specific gravity of about 1015, containing lymph corpuscles, and coagulating when drawn from its vessels. *Composition:* Proteins (serum albumin, fibrinogen), sugar, sodium chloride and carbonate, water, urea, fat. *Function:* To provide cells and tissues with materials necessary for their growth, repair, and functional activities; and to receive and carry away their waste products.

2. "The tooth papillæ are all preformed at the time of birth. They remain latent and develop regularly into the different teeth. A serious illness of a child just before their eruption may affect their healthy growth by interfering with proper nutrition, and imperfect and pitted teeth result, which often accounts for an early decay."—(Hill's *Histology.*)

3. The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their functions are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

There are also *platelets*, which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. Their function is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about 200,000 to more than 500,000 in each cubic millimeter of blood.

4. Cold weather causes a constriction of the cutaneous arterioles, and this leads to a dilatation of the arterioles of the splanchnic area (which includes the vessels of the kidney). This causes a rise in the capillary pressure of the glomeruli of the kidneys, and the result is an increase in the output of urine.

5. *Insects dangerous to health:* Ants, bedbugs, fleas, flies, mosquitos, sand-flies, tsetse-flies, midges. *To abolish mosquitos*, get rid of all stagnant water, use mosquito netting; *sand-flies* can be exterminated by the use of formalin spray, good floors and walls to houses, removal of all old woodwork, and frequent painting and varnishing of fixtures; *flies* are dealt with by screening, fly papers, disinfectants, and absolute removal of waste material and manure; *bedbugs* require fumigation with formaldehyde or sulphur, absolute cleanliness, pyrethrum powder, and washing floor and wooden bedsteads with emulsion of kerosene oil; for *fleas*, absolute cleanliness.

6. Diminution of the blood supply to muscle results in diminution of muscular activity.

7. "In man, before the consequences of thyroidectomy were known, the whole gland was not infrequently excised for goiter. If the parathyroids happened also to be completely involved in the operation, death quickly followed. But where only the thyroid itself, or the thyroid *plus* the small internal pair of parathyroids, was extirpated, the condition called cachexia strumipriva was observed to supervene. The symptoms resemble those of the disease known as myxedema, in which the characteristic anatomical change is an increase of the connective tissue in and under the true skin. Newly formed connective tissue always contains an excess of mucoids, and for this reason in the early stages of myxedema there is somewhat more than the usual amount of these substances in the subcutaneous tissue. The skin is dry, and the hair falls off. The features are swollen and heavy, the movements clumsy and trembling. As the disease progresses the mental powers deteriorate, too; the patient becomes stupid and slow, and perhaps, at last, imbecile."—(Stewart's *Physiology*.)

8. *Aphasia* is a morbid condition consequent on a cortical or subcortical lesion, whereby speech, writing, or reading may become impaired, either from an inability to coordinate the necessary movements involved in speech or from a defective interpretation of sounds or visual impressions. . . . Speech involves a healthy continuity between the chief motor center in the left inferior frontal lobe and the visual and acoustic centers on the one hand and between the chief motor center and the muscles employed in speech or reading aloud on the other. The centers assigned to speech and writing are motor and sensory, distributed thus: (1) a motor (*glosso-kinesthetic*) speech center, in the third left frontal (Broca's convolution); (2) a motor (*cheiro-kinesthetic*) center for writing, in the posterior part of the second left frontal convolution; (3) sensory centers; (a) *auditory word center*, in the posterior part of the first temporal convolution; (b) the *visual word center*, in the angular gyrus. The motor centers connect with each other and the sensory centers by commissural fibers. The similar but subordinate centers in the right hemisphere have a limited capacity for taking over the functions of the left centers when these are destroyed.—(Wheeler and Jack's *Handbook of Medicine*.)

9. The acidity of the stomach is maintained by the formation of hydrochloric acid. This may be the result of the action of disodic phosphate on calcium chloride:

$$2Na_2HPO_4 + 3CaCl_2 = Ca_3(PO_4)_2 + 4NaCl + 2HCl.$$

Or, it may be due to the action of carbonic acid on disodic phosphate, thus:

(*a*) $Na_2HPO_4 + H_2CO_3 = NaH_2PO_4 + NaHCO_3$

(*b*) $NaH_2PO_4 + NaCl = Na_2HPO_4 + HCl.$

10. "The blood cell count is readily done with the Thoma-Zeiss hemocytometer which consists of two graduated capillary pipettes, *i.e.* the erythrocytometer and the leucocytometer for counting red and white cells, respectively. The blood is drawn by suction or capillary attraction from the drop obtained by puncture until it reaches the point marked 1, then rapidly wiped dry and the diluent quickly drawn in until it fills the bulb and reaches the mark 101. While drawing in the diluent the pipette is revolved between the finger and the thumb to set in motion the mixing bead contained in the bulb, and when filled again thoroughly shaken and revolved for half a minute. This mixing should be repeated each time before expelling a drop for examination. One has then a mixture, each drop

of which presents a blood dilution of 1:100. Many prefer a 1:200 dilution readily obtained by using the mark 0.5 as the upper limit for the indrawn blood. The blood rises quickly if the pipette is perfectly clean and may exceed the proper level if not watched or checked by withdrawing the point and quickly wiping it. If the higher dilution is used any excess is readily blown out or better drawn down by touching the tip with filter paper or blotter. The next step consists in expelling the diluent occupying the capillary portion of the tube, after which a small drop of the mixture in the bulb is placed upon the central disc, the cover glass is placed in position and the cells given time to settle.

The drop should just or very nearly fill the central plateau without running over into the moat around it when the cover glass is applied, else the process must be repeated after thoroughly cleaning and drying the cover glass and counting surface. At the point of contact between the cover glass and the underlying plate concentric color rings should appear indicating perfect contact. Their absence vitiates the count and indicates dust or moisture which must be removed and the process repeated. The specimen being placed under the microscope carrying a Leitz No. 6 objective and a No. 4 ocular, or their approximate equivalents, should show an even distribution of cells throughout both the ruled and unruled fields. Up to this point a certain amount of blood diluted 100 times has been placed upon a field so ruled that each of its squares represents an area of 1/20 x 1/20 mm. *i.e.* each side of the square represents 1/20 mm. A third dimension has been added by the cover glass brought into contact with the blood, but lying 1/10 of a mm. above the level of the depressed central disc which carries the squares upon its surface. One has now to count the number of cells lying within a definite number of the small squares and for the sake of accuracy it is best to include the whole 400, though for ordinary work a less number may be taken if the blood seems to be perfectly distributed. One should pursue a systematic course, crossing from left to right and back from right to left and so on, counting not only the cells that lie within each square, but those that touch its upper and left-hand sides. Having counted the cells, say in 100 squares, one multiples by 4,000 if the original dilution was 1:000, and by 8,000 if it were 1:200, the result representing the number of cells in 1 cm. of the blood under examination. The blood counter

must in every case be cleaned immediately after using, (first) with water, (second) alcohol, (third) with ether, and the glass bulb should be absolutely free and movable after the process is completed. If to be again used at once, air should be blown through the tube by means of a hard bulb and rubber tube, not the mouth. The counting chamber should be cleaned with cold water only and should not be exposed to direct sunlight for fear of softening the cement.

The Leucocyte Count.—"For this the large calibered pipette is used with a diluent consisting of an aqueous solution of glacial acetic acid (0.5 per cent.), which leaves visible only the white cells. The most accurate counts are made by using 0.5 rather than 1 as the basis of the dilution, and even this requires a good sized drop. Furthermore, the pipette must be kept nearly horizontal at the time and after the diluent is added, else it will run out of the tube. The diluent is then added to the point 11 and the count can be made with the erythrocyte counting chamber or better with Zappert's chamber in which the central square (one millimeter) is surrounded by 8 unruled squares of the same size. The total obtained by counting the leucocytes in the nine squares is multiplied by 200 and divided by nine, assuming a dilution of 1:200 as above described.

"If the ordinary counting chamber is used, the process is greatly facilitated by inserting an eyepiece diaphragm into the tube of the ocular, which will cut off exactly 100 of the small squares. These may be bought or can be made by the physician from metal or cardboard. The leucocytes in 400 small squares of the erythrocyte chamber may then be rapidly counted and as many additional outside diaphragm fields as are necessary to correct work. Accurate white blood counts require patience and the counting of a large number of fields for a slight error has a disastrous effect. Usually two drops of the 1/10 or four drops of the 1/20 dilution will enable one to count 140-150 cells."—(Greene's *Medical Diagnosis.*)

PATHOLOGY AND BACTERIOLOGY.

1. "*Active hyperemia* may be due either to paresis of the vasoconstrictor nerves or to stimulation of the vasodilators, both of which events cause relaxation of the muscular tissue of the arteries, or to direct weakening or paralysis of the muscular coat of the arteries, as by heat or by trauma. A collateral hyperemia occurs when the blood supply to some other part

is diminished. Thus if an artery be blocked, the area supplied by it will be anemic, and around this a zone of hyperemia will for a time be present.

"*Passive hyperemia* or engorgement arises from interference with the venous outflow from a part. This may be due to various factors. The venous circulation is mainly carried on by the contraction of the muscles and by the aspiration toward the thorax which occurs during inspiration. If these forces fail, the blood stagnates in the veins and especially collects in the most dependent parts. The term 'hypostasis' is sometimes erroneously applied to this condition, but should be reserved to indicate the post-mortem gravitation of the blood.

"The causes of general passive hyperemia are enfeebled heart's action and uncompensated valvular disease, of local passive hyperemia, the interposition of an abnormal resistance in the course of the veins; the latter may be caused by external compression, by tumors, by occlusion of the lumen, by growths, thrombosis, contraction of scar tissue, etc., by increased pressure in the abdomen by the pregnant uterus, tumors, and the like.

"If there be free anastomosis in the region supplied by the occluded vein, the hyperemia subsides as soon as the collateral circulation becomes established, but if this does not occur the engorgement will persist, as is the case when such veins as the splenic, the renal, the portal, and the sinuses of the dura mater are occluded."—(Hewlett's *Pathology*.)

2. The lungs are congested and edematous; the kidneys, liver, and spleen are enlarged, congested, soft and pulpy; and cloudy swelling will be found in the secreting glands.

3. The kidneys contain emboli in which may be found bacteria; infarction is present and is observed as a wedge-shaped hemorrhagic area at each point of infection; abscesses are also present.

4. "*Abscess of the liver* is always the consequence of microorganismal infection; the microorganisms are various, and they reach the liver by one of several pathways. The common causative microorganisms are the ordinary staphylococci and streptococci, Ameba coli, Bacillus coli communis, Bacillus pyogenes fœtidus, Bacillus typhosus, Bacillus dysenteriæ, Bacillus pyocyaneus, Diplococcus pneumoniæ, Proteus vulgaris, Actinomyces bovis, etc. The infecting agent or agents may reach the liver directly, as in case of traumatism, or by extension of disease of adjacent organs; or the in-

fection may be carried from afar by the blood stream, that is, by the portal vein, by the hepatic artery, by the hepatic veins, by the biliary ducts, or by the lymphatics."—(Kelly's *Practice of Medicine.*)

5. *Thrombosis of the mesenteric vessels* may be caused by infections, ulcerations, embolism, cirrhosis of the liver, pylephlebitis; it is found most often in anemic and cachectic patients.

6. *Pathology of cystitis:* "The lesions may be catarrhal, suppurative, or ulcerative; unilateral or bilateral; and acute or chronic. In the catarrhal process there is swelling, edema, and congestion of the mucosa, with the excessive formation of mucus; in aggravated cases considerable mucopus or almost pure pus is formed, and there is more or less desquamation and superficial erosion of the epithelium and foci of hemorrhage; or more or less widespread and deep ulceration may occur. In the chronic cases there is, in addition, more or less thickening and pigmentation. Rarely fibrinous exudations or gangrene ensue. There is, as a rule, more or less decomposition of the urine with the precipitation of urates and phosphates. When the infection extends from the renal pelvis to the kidney substance (urogenous pyelonephritis) yellowish purulent streaks are found extending from the papillæ into the medulla and the cortex, and small miliary abscesses throughout the kidney, but most numerous in the cortex just beneath the surface and arranged often in groups. In the event of obstruction in the renal pelvis, the ureter, bladder, or urethra, with consequent increased intrapelvic (renal) pressure, the pelvis and calices become distended, the renal tissue more or less destroyed, and the kidney ultimately converted into an intercommunicating, many-chambered pus sac (pyonephrosis) lined by the remains of the pelvic mucosa; should this become very large, very little kidney tissue may be demonstrable (degeneration, atrophy, and replacement by connective tissue)."—(Kelly's *Practice of Medicine.*)

7. *Elephantiasis* is the hypertrophic condition of the skin and underlying tissue, having its origin in lymphatic obstruction and characterized by edema, enlargement, thickening of the skin, overgrowth of the papillæ, and pigmentation. The causal lymphatic obstruction may be due to tumors, cicatrices, erysipelas, and the *Filaria sanguinis hominis.* It is most common in the tropics and is most often observed in male adults. The structural changes incident to the disease are hypertrophy of the entire skin and subcutaneous tissue,

edema of affected structures, and dilatation of the blood-vessels and lymphatics with inflammation of the latter. The disease usually affects the leg and foot but the genitalia may be attacked.—(Hughes' *Practice of Medicine.*)

8. In *myelogenous leukemia* the red blood cells are greatly diminished, the hemoglobin is also diminished, normoblasts and megaloblasts are present. The leucocytes are enormously increased in number, there may be 300,000 to the cubic millimeter instead of 10,000 or 12,000 as is normally the case; mast-cells are present, and myelocytes are found in large numbers. The proportion of polynuclears is not disturbed.

9. *Pathology of malaria:* "During the paroxysms, the principal changes are: (1) Enlargement of the spleen, sometimes very great. In recent cases the organ is soft; in older cases firm ('ague cake'); (2) Enlargement and congestion of the liver; (3) Congestion of the bone marrow, the brain and meninges, and the kidneys. In all these organs the vessels are full of plasmodia and of melanin. There is also present a yellow pigment, not confined to the vessels, which consists of altered hemoglobin. Marked diminution of the number of red cells, and pigmentation of the leucocytes, are conspicuous features. The lymphocytes are also relatively increased for some time after the paroxysm, but leucopenia, not leucocytosis, is a feature of malaria. In malarial cachexia the spleen is not necessarily pigmented. The enlargement is mainly due to thickening of the capsule and trabeculæ, and the organ is hard. The liver is frequently enlarged. Anemia is a conspicuous feature."—(Wheeler and Jack's *Practice of Medicine.*)

10. "*Necator americanus*, the New World hookworm, is a cylindrical worm, 5 to 11 mm. long, and is possessed of a dorsal and a ventral pair of lips at the mouth, a prominent dorsomedian buccal tooth, and four buccal lancets; in the male the dorsal ray of the bursa divides at the base and each branch possesses two tips; in the female the vulva is the anterior half of the body; the eggs are thin shelled, 64 to 72μ long, by 36 to 40μ broad; they are oval with somewhat bluntly rounded poles."—(Kelly's *Practice of Medicine.*)

DIAGNOSIS AND THERAPEUTICS.

1. Three important complications which may occur in lobar pneumonia: Pleurisy, pericarditis, and endocarditis. *Pleurisy* may require morphine to alleviate the pain, or heat or cold, or a blister; a saline cathartic is of service; and aspiration may be indicated.

2. *Complications of whooping-cough:* Hemorrhages, bronchopneumonia, emphysema, and pleurisy. Fresh air, isolation, opiates, chloral, bromides, belladonna and quinine are among the most useful remedies. Kilmer's belt is said to be of service.

3. *Ludwig's angina* is an acute suppurative inflammation of the cellular tissue in front of the neck; it begins in the floor of the mouth, generally in the submaxillary gland. It is due to infection by the *streptococcus pyogenes*, and may follow diphtheria, scarlatina or injuries.

4. Chills, fever, and sweating constitute the typical paroxysm of malaria.

"The specific for malarial fever is quinine, which, properly given, destroys the parasites in the blood. It should be given promptly, and in the early stages in doses up to 30 grains in the twenty-four hours, and continued in doses sufficient to produce moderate singing in the ears for a week after the parasites have disappeared from the blood. The dose may then be gradually reduced, but the drug must be continued for at least three months. It may be given in capsule or in acid solution. In grave or pernicious cases it may have to be given hypodermically, to secure a prompt effect, in doses up to 10 grains thrice daily. The injection should be made into muscle, not subcutaneously. In chronic cases small doses of quinine, if plasmodia are present, are enough."—(Wheeler and Jack's *Practice of Medicine.*)

5. *Exophthalmic goiter* is a disease of unknown origin, occurring most frequently in females. Fear, fright, worry, excitement, shock, overstrain, and thyroid derangement have all been suggested as etiological factors. The *symptoms* are tachycardia, intention tremor, enlargement of the thyroid and exophthalmus. The upper eyelid is retracted, and there are other eye symptoms. Treatment consists in rest (both physical and mental), fresh air, moderate diet, absence of excitement; belladonna, bromides and other drugs have been recommended and also condemned; recently serum treatment has been advocated; surgical treatment (partial thyroidectomy, and excision of the superior ganglion of the cervical sympathetic nerve) has been recommended, and if adopted local anesthesia should be used.

6. "*Urticaria* is an inflammatory affection of the skin, characterized by the formation of evanescent whitish and pinkish elevations, attended by intense itching. It usually arises from some disturbance of the alimentary canal. Certain articles of food, such as lobsters, crabs,

sausage, strawberries, etc., and certain drugs, as quinine, copaiba, cubebs, salicylic acid, etc., are prone to produce the affection. The treatment consists in the use of emetics, laxatives, and enemas to expel the offending substances. Intestinal antiseptics should then be administered. Salol or phenacetin (gr. 5-10) may be given in subacute cases. Lotions containing carbolic acid, menthol, liquor carbonis detergens, benzoic acid, sodium carbonate, etc., may be used to relieve the itching."—(*Pocket Cyclopedia.*)

7. Cerebral tumor, or arteriosclerosis of cerebral arteries.

8. "*Treatment of gout.*—During the acute stage, the limb must be kept at rest and elevated, and hot fomentations should be applied to the joints. The diet should consist of milk and barley water, and farinaceous foods. Plain water may be freely taken, and the mineral waters have no advantage over it. Medicinal treatment should begin with a mercurial purge, and the bowels should be daily opened by a saline laxative. Colchicum wine should be given every four hours, along with citrate of potassium and hyoscyamus. It should be stopped when the pain is relieved, and if it fails morphine may be required. Laudanum or lead and opium lotion may be added to the fomentations. When the acute attack subsides, gentle friction or shampooing, and passive movements are beneficial. In *chronic gout*, careful regulation of diet, avoidance of food rich in nucleins (sweetbreads, liver, kidneys), moderation in the use of alcohol, or still better, total abstinence, and proper exercise are the principal points to remember. Arsenic, strychnine, quinine, guaiacum, and iodide of potassium may all be useful in different cases. A course of waters at a spa is valuable from the regular life that it ensures."—(Wheeler and Jack's *Practice of Medicine.*)

9. HERPES ZOSTER. *Causes.*—"The eruption and consequent neuralgic pains are the immediate result of an inflammation of the posterior ganglia of the spinal nerve roots; but the cause producing this condition is obscure. Among the many that have been suggested are: cold, injuries to nerves, anemia, malaria, and the medicinal use of arsenic. *Symptoms.*—The affection begins with neuralgic pains, either of a burning or lightning-like character, with slight febrile phenomena, followed by the appearance of papulovesicles along the tract of pain; these soon become vesicles situated on bright red, highly inflamed bases. The vesicles are about the size of pin heads, or, perhaps, a little larger;

usually discrete, although they frequently coalesce, forming irregular patches, appearing in groups until the third to the fifth or even tenth day, when they gradually desiccate, and at the end of the second week nothing remains except occasionally a slight scar, which may disappear or become permanent. When the eruption is at its height, it is perfect in its anatomic formation, each vesicle being well shaped and seated on a bright red, inflamed patch of skin, and distended with a translucent, yellowish fluid. The vesicles show no tendency to rupture spontaneously. In rare instances they may become purulent, hemorrhagic, or gangrenous. The eruption is almost invariably confined to one side of the body, although in rare instances it is seen upon both sides. It is usually found upon well known nerve tracts. Recurrence is rare. *Treatment.*—The pain will require the administration of antipyrin, gr. xv, every three or four hours; phenacetin, gr. v, every three hours; sodium salicylate, gr. x to xv, every three hours; or if very severe, morphine, gr. ⅛, and atropine, gr. 1/100, hypodermically near the lesion. A combination of zinc phosphide and nux vomica is sometimes of value. Locally, aristol, boric acid, zinc oxide, and similar powders dusted over the lesions are of value. Flexible collodion, containing morphine, painted over the vesicles serves to protect them and lessen the pain."—(Hughes' *Practice of Medicine.*)

10. ERGOT. *Therapeutic indications:* To promote uterine contractions during third stage of labor; fibroids, menorrhagia, postpartum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headache, laxity of sphincters, of bladder or rectum, hemorrhoids, aneurysm, diabetes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

OBSTETRICS AND GYNECOLOGY.

1. The blood-pressure should be taken during pregnancy, because a continuously increased pressure is one of the earliest evidences of a toxemic condition.

2. The patient should be advised to avoid indigestible or very highly seasoned articles of food; her diet should be nutritious and sufficient. In patients who have previously had unduly heavy children it would be well to restrict the carbohydrates and fluids during the last two or three months of pregnancy. The tendency to constipation, which may be increased during pregnancy, should be overcome by laxative foods or fruit.

3. Multiple pregnancy may be diagnosed by the following signs: (1) The abdomen may be irregular in shape and may show a sulcus indicating the space between the two fetal sacs; (2) persistent and increased tension of the uterine walls; (3) two fetal heart sounds may be heard; (4) multiplicity of small parts; (5) two fetal heads or backs may be palpated; (6) diminished fetal mobility. Sometimes it is difficult to diagnose the condition before the birth of one child.

4. At times it is difficult to make a differential diagnosis between uterine fibroma and pregnancy; but *if you can afford to wait the course of time will prove the* diagnosis. The following table is from Dudley's *Gynecology:*

PREGNANCY.	FIBROIDS.
1. History of pregnancy.	1. Absent.
2. Uterus soft and elastic.	2. Usually irregular in form and harder.
3. Consistence varies with uterine contraction.	3. Uterine contractions not marked—very important sign.
4. Cervix soft.	4. Hard or not so soft.
5. Regular and uniform increase in size of uterus.	5. Growth slower and irregular.
6. Later, ballottement, fetal heart-tones.	6. Absent.
7. Palpation of fetus.	7. Palpation of myoma.

5. When a hand is found presenting: In head presentations if the condition be diagnosed before rupture of the membrane nothing should be done until the cervix is completely dilated. Then the hand may be pushed up to allow the head alone to engage in the brim. If this fail, forceps may be applied to the head if there be no risk of catching the arm, or version may be carried out. In extracting with forceps the arm may slip up. When the case is made out only after the arm is well engaged in the brim, the head should be delivered with forceps. In breech presentations, sometimes the hand presents. Nothing need be done. The hand may or may not slip up.—(Jewett's *Obstetrics.*)

6. Symptoms of death of fetus are: cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements are absent, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete

milk. If the fetus has been dead for some time crepitus of its cranial bones may be elicited.

Fetal death. Causes: Syphilis, apoplexy of placenta or membranes, diseases of ovum or uterus, nephritis, poisoning (including tobacco and alcohol). *Positive sign:* Failure, after repeated examinations, to get the fetal heart sounds and movements after they have been obtained on previous occasions. *Treatment:* Induction of abortion or premature labor, at once, with complete removal of the contents of the uterus.

Questions will be on the line of the *cause* of the condition; and advice will be given about the treatment of the causal condition.

7. *Pus tube,* or pyosalpinx, or purulent salpingitis is a "disease caused by the septic and gonorrheal varieties of endometritis. The inflammation of the uterine mucosa extends directly to the tubes and produces in them the same form of infection. Purulent salpingitis is a very common disease, and is, with very few exceptions, the cause of the various inflammatory lesions met in the pelvis. The vast majority of cases that are due to sepsis are puerperal in origin, and they even exceed in number those that are due to gonorrhea. In nearly all instances where the endometrium is the seat of a gonorrheal or septic infection the tubes become involved; on the other hand, however, we undoubtedly meet cases in which the disease remains confined to the uterine cavity and the oviducts escape entirely.

"There are several ways by which the infection may escape from the tube to the adjacent structures: 1. The purulent secretion may escape through the abdominal opening of the tube. 2. The infection may be carried by the lymphatic channels through the walls of the tube. 3. The pathogenic organisms may penetrate the mesosalpinx and infect the cellular tissue of the broad ligament. 4. A pyosalpinx may rupture and its contents escape into the pelvic cavity. 5. Adhesions may form between the tube and the surrounding structures and later on the infection may pass through them to the adherent organ.

"A gonococcus infection starts as a subacute or a chronic condition and is not, as a rule, immediately dangerous to life. A streptococcus infection, on the other hand, is acute or active from the beginning and is always perilous to life from the first. Both forms usually cause permanent damage to the tubes as well as pelvic adhesions, sterility, and chronic invalidism, and they also endanger the life of the patient from recurrent attacks of peritonitis, fresh infection, rupture

of a tubal abscess, and exhaustion following a prolonged suppuration."—(Ashton's *Gynecology.*)

8. OPHTHALMIA NEONATORUM. *Prophylaxis:* Whenever there is a possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 or 2 per cent. solution of nitrate of silver immediately after birth.

Treatment: Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burnt.

9. *Icterus neonatorum* is caused by the resorption of bile, due to the small caliber of the biliary duct; or to bacterial infection of the blood. Treatment is, as a rule, unnecessary; a mild laxative or enema may be given; in severe cases treatment is of no use.

10. *Caput succedaneum* requires no treatment as it disappears gradually within a few weeks.

SURGERY.

1. The source of the blood should be determined. "In *renal* hematuria the blood is intimately mixed with the urine, individual red cells are usually decolorized, and blood casts are found. If the blood is from the *pelvis of the kidney,* or the *ureter,* coagula corresponding in shape to the pelvis, or the ureter, may be found. It may be necessary to employ ureteral catheterization. In hemorrhage from the *bladder,* the blood and the urine are not so distinctly blended, the clots may be of such an irregular form and large size as to indicate their origin, and the individual cells retain their normal appearance. The cystoscope may be required to determine this point. If the blood is from the *urethra* it ordinarily drips away spontaneously, and if the urine is voided the last portion is clear."—(Butler's *Diagnostics of Internal Medicine.*)

2. With no more information than that given in the question I would not advise anything to be done.

3. *Splenectomy is indicated* in some cases of movable spleen, hypertrophy, injury and tumors of the spleen.

4. *Osteomyelitis of the tibia.* "Treatment must be very prompt. A free incision must be made through the periosteum and the pus evacuated. In any case, whether pus is found or not, the surface of bone must

be gouged away to expose the medulla freely, and any gangrenous tissue scraped out. The cavity must then be washed out and freely drained. The wound in the soft structures is not closed in any part. If symptoms of pyemia occur, it may be necessary to amputate the limb through the joint or bone above, so as to cut off the source of the emboli. When a large portion of, or the whole diaphysis is necrosed there are two courses; either to cut short the disease by removing the dead portion at once, or to leave the sequestrum to stimulate the formation of an involucrum. Where there is a single bone, as in the arm and thigh, the sequestrum is left; where there is a double set of bones, as in the forearm and leg, the sequestrum is removed at once. Celluloid, zinc, and ivory rods have been inserted to stimulate osteogenesis. In most cases it is doubtful how much bone is actually dead, so that it is better to provide free drainage, wait six weeks or longer, and then open up the cloacæ in the newly formed involucrum to remove the sequestrum. The cavity heals by granulation."—(*Aids to Surgery.*)

5. *Artificial pneumothorax* is a condition of pneumothorax produced by the injection of nitrogen (or other gas) into the pleural sac; it has been used for the cure of phthisis.

6. "*Pulmonary abscess* when acute is usually a sequel of septic pneumonia, and is often associated with gangrene of the lung. Chronic abscess may be due to the spread of an empyema or of a hepatic abscess to the lung. The sputum is abundant, yellow, and cream like, and contains elastic fibers and hematoidin crystals. The physical signs of a cavity in the lung are present, and this may be localized by the *x*-rays. The result of pneumonotomy in such cases is on the whole satisfactory. Pyemic abscesses are usually multiple, and therefore not so amenable to surgical treatment."—(Thomson and Miles' *Manual of Surgery.*)

7. "*Fat necrosis* is a common concomitant of acute hemorrhagic and gangrenous pancreatitis, and may be observed also in association with chronic suppurative and chronic interstitial pancreatitis. It occurs as disseminated or multiple minute foci in or upon the pancreas, and as larger foci (2 to 3 mm. in diameter) in the fat of the omentum, and of the subperitoneal and retroperitoneal tissues, and sometimes in the pericardial and subcutaneous fat. Extremely large foci have occasionally been observed. The foci are whitish or yellowish and opaque (in marked contrast to the translucent yellow of the normal fat), and they are frequently surrounded by a narrow zone of hemorrhage. They con-

sist of lime and certain fatty acids. Flexner has demonstrated the presence of the fat splitting ferment (presumably that of the pancreatic juice) in distant necrotic foci (subcutaneous and peritoneal fat), as well as in the foci in the immediate vicinity of the pancreas. Fat necrosis is believed to result from diffusion of the pancreatic ferment in consequence of hemorrhagic destruction of the gland or obstruction of the ducts."—(Kelly's *Practice of Medicine.*)

Treatment: "As the diagnosis of these conditions can rarely be made with certainty, an exploratory laparotomy must be performed. After the abdomen is opened, the recognition of fat necrosis, evidenced by the minute, opaque, white areas scattered through the omentum and mesentery, and the presence of a serohemorrhagic effusion, go far to establish the diagnosis. The most simple and direct access to the pancreas is obtained by making an opening in the gastrocolic omentum, pulling the stomach upwards and the transverse colon downwards, and incising the posterior parietal peritoneum. The gland thus exposed is then palpated so as to localize the area of disease, and, after packing off the peritoneal cavity, the pancreas is incised. Necrosed tissue is removed with the spoon or scoop, and the cavity packed with gauze. If there is an accumulation of blood, as in the hemorrhagic form, this is removed, and, to prevent further extravasation, the cavity must be firmly packed. If there is a collection of pus, provision must be made for drainage either through the abdominal wound or through a separate opening made behind in the right or left costovertebral angle. If there is also cholelithiasis, this must be dealt with later."—(Thomson and Miles' *Surgery.*)

8. *Etiology of cholelithiasis.*—Any obstruction to the free outflow of bile, catarrhal inflammation of the bile ducts, bacteria, foreign bodies; excess of carbohydrate diet and sedentary habits, with constipation are predisposing causes.

9. *Anastomosis of blood vessels* has been employed in cases of threatened or commencing gangrene of the extremities, associated with arteriosclerosis.

10. If practicable, the whole mass should be removed; if there are extensive adhesions removal is impossible. Secondary growths, and metastasis to viscera are likely to occur, and exhaustion, shock, and death ensue.

PEDIATRICS AND TOXICOLOGY.

1. ***Essentials*** *for the production and preservation of*

pure dairy milk: Vaughan's rules are as follows: "(1) The cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60° Fahr., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered, during the summer, in refrigerated cans or in bottles about which ice is packed during transportation. (8) When received by the consumer it must be kept in a clean place, and at a temperature some degrees below 60° Fahr."

2. CHOLERA INFANTUM. *Causes:* It is caused by microorganisms. It is very rarely seen in breast-fed babies, being met with almost invariably in those artificially fed. It is most common among the poor of large cities during very dry and hot summers, and it often assumes an epidemic form. *Treatment.*—When vomiting is very severe, the stomach should be washed out with a warm solution, such as saline, or ½ to 1 per cent. boric acid, or 1 per cent. sodium bicarbonate, or a solution of resorcin, 1 in 5,000. After this drop doses of the glycerin of carbolic acid in a teaspoonful of water every hour should be tried, or small doses of calomel placed on the tongue may be given. All food by the mouth had better be withheld, and only small pieces of ice given to suck, or if the child be very young, the ice may be wrapped in a cloth, which it may be allowed to suck. At the same time a sinapism is applied to the epigastrium, one part of mustard to four parts of flour. Dr. Holt relies most on the hypodermic injection of morphine and atropine, and he advises repeated small doses as being preferable to one

large dose. For a child a year old 1/50 grain of morphine with 1/800 grain of atropine may be injected and repeated in an hour. It soothes, and the child falls into a quiet sleep for a few hours, after which the stomach will retain small quantities of light nourishment. After this lull in the attack, one or other of the antiseptic drugs may have a trial."—*Aids to Diseases of Children.*)

3. *Indications of pyloric stenosis.*—Persistent and projectile vomiting, scanty feces and urine, emaciation, dilated stomach with collapsed intestines; sometimes a thickening around the pylorus may be felt.

4. *The treatment of chorea* consists in rest and the avoidance of overexertion of any kind. Correct any error of refraction or gastrointestinal disturbance. Tea, coffee, candy, cakes, and sweets should not be a part of the diet of children. Milk should be given in large quantities. A daily warm bath, systematic massage, and electricity to the spine are useful. Chloral and bromide are occasionally necessary to control the movements. Arsenic in Fowler's solution, three drops three times daily, diluted, may be given to a child 6 to 9 years of age, increasing one drop every day. Constitutional symptoms of the arsenic-poisoning should be watched for carefully. When anemia is present, iron in Blaud's pill, gr. 5-15, or the tincture, gtt. 10-30, three times daily, may be given to a child. Quinine may be given in large doses. The fluid extract of cimicifuga (♏ 10-20) may be given to a child 6 years old, increasing the dose until headache, dizziness, etc., are produced. Trional and chloralamid are indicated if the sleep is disturbed. Recurrence is prevented by the continuance of the treatment just given. Complications, such as rheumatism and endocarditis, will require the same treatment as if occurring independently. The building up of the general health and moral and suggestive treatment are useful in all forms of the disease.—(*Pocket Cyclopedia.*)

5. *Dangers incident to removal of tonsils and adenoids:* Laceration of surrounding tissues, hemorrhage, asphyxia, death from the anesthetic particularly in children who show evidences of the status lymphaticus.

6. *Varieties of congenital herniæ: Congenital inguinal hernia,* in which the sac is formed by the funicular process; sometimes the sac lies above and distinct from the tunica vaginalis (*funicular* variety); and sometimes the sac is continuous with the tunica vaginalis (*vaginal* variety). *Treatment* consists of a well

fitting truss; after three years of age operation may be considered. There is also a *congenital umbilical* hernia, in which the intestine protrudes into the base of the umbilical cord; it is a rare condition and demands prompt laparatomy with reduction of the intestine, and closure of the umbilical opening by sutures.

7. "*Acute hydrocephalus*, is a synonym for tuberculous meningitis. *Chronic hydrocephalus*, to which the term is now usually restricted, may be (1) *Congenital.* The causes are not known, but there is sometimes a family proclivity to the affection. (2) *Mechanical;* due to obstruction of the veins of Galen, as by the pressure of a tumor, or to blocking of the foramen of Mengendie, as by meningitis, or of the iter. (3) *Idiopathic.* This form is due to serous effusion into the ventricles, and may occur at any age. A serous meningitis and an angioneurotic condition have both been invoked to explain it.

"*Treatment* is very unsatisfactory, if not hopeless. (1) Pressure by strips of plaster or elastic bands. (2) Puncturing at various intervals, and drawing off the fluid. The ventricles may be tapped, and direct drainage established, or the fluid may be more slowly removed by puncture of the subarachnoid sac in the lumbar region."—(Wheeler and Jack's *Handbook of Medicine.*)

8. *Symptoms of toadstool poisoning:* These sometimes do not appear for several hours, and there may be no disagreeable taste to indicate the poisonous nature of the food. Then there is likely to be sudden and great prostration, with cold perspiration, headache, amaurosis and stupor, or wild delirium. There is frequently marked cyanosis, and sometimes icterus. Usually there is some fever, with rapid, feeble pulse. The urine is scanty and albuminous or bloody and sometimes suppressed. Death usually occurs in from eighteen hours to three or four days from exhaustion or cardiac paralysis. There is usually much abdominal pain and sometimes diarrhea, with rice water discharges closely resembling cholera. *Treatment:* Elimination of the poison by emetics and cathartics and the hypodermic use of atropine. The stomach tube is not usually very successful in removing the poisonous material, as it clings tenaciously to the walls of the stomach. There is no chemical antidote known. Atropine is the best physiologic antidote and frequently gives very prompt relief.—(Riley's *Toxicology.*)

9. *Symptoms of belladonna poisoning:* In the first stage, that of delirium, there are, dryness of the throat,

thirst, difficulty of deglutition and spasms upon swallowing liquids, face at first pale, afterwards highly reddened, pulse extremely rapid, eyes prominent, brilliant, with widely-dilated pupils, complete paralysis of accommodation, disturbances of vision, attacks of giddiness and vertigo, with severe headache, followed by delirium, occasionally silent or muttering, but usually violent, noisy, and destructive, accompanied by the most fantastic delusions and hallucinations. Usually the urine is retained, and the body temperature is above the normal. The delirium gradually subsides, and the second stage, that of coma, is established, with slow, stertorous respiration, and gradually failing pulse, until death occurs from respiratory or cardiac paralysis, or sometimes in an attack of syncope during apparent amelioration.—(Witthaus.)

The *symptoms of poisoning by strychnine* are as follows: "Strychnine produces a sense of suffocation, thirst, tetanic spasms, usually opisthotonos, sometimes emprosthotonos, occasionally vomiting, contraction of the pupils during the spasms, and death, either by asphyxia during a paroxysm, or by exhaustion during a remission. The symptoms appear in from a few minutes to an hour after taking the poison, usually in less than twenty minutes; and death in from five minutes to six hours, usually within two hours."

10. *Chronic lead poisoning:* "The early symptoms are often very obscure. Various symptoms of indigestion are first noticed with progressive emaciation and mental depression, with anemia and a peculiar whiteness of the skin probably due to contraction of the peripheral capillaries. Sometimes a blanching of the fundus of the eye or amaurosis due to a similar contraction of the capillaries is an early symptom. Then a twisting grinding pain around the umbilicus comes on and gradually becomes more severe. It may be relieved by pressure. The abdomen is hard and retricted. As a rule the bowels are obstinately constipated, but occasionally there may be scanty, hard, clay colored, painful evacuations. The urine is diminished or suppressed, the skin sallow, cold, and clammy, the breath fetid, mouth and throat dry, and a blue line on the edge of the gums next the teeth, most noticeable next to the incisors, which are discolored and brown. This blue line may be developed as early as three days after ingestion of the poison. The gums are tender and bleed easily. The pulse is generally decreased in frequency. As the case progresses, or after repeated attacks, paralysis begins to appear, affecting chiefly the

extensor muscles of the forearm, though not limited to them, sometimes extending to the interossei, and generally affecting first those muscles which are most imperfectly supplied with blood. The paralysis is symmetrical, generally affecting the corresponding muscles in both arms, and is often preceded by numbness of the fingers and hands. The affected muscles become more or less atrophied, leading to general debility ("lead palsy"). The nervous system becomes affected, and headache, vertigo, amblyopia, amaurosis, delirium (sometimes furious) and epileptoid convulsions precede death. Albuminuria is frequently, and jaundice occasionally, present. In many cases severe pain in the joints is one of the most prominent symptoms, probably due in some manner to interference with the functions of the kidneys.

Treatment: "For the removal of lead from the tissues with which it has entered into a more or less stable combination potassium (or sodium) iodide in doses of 10 grains three times a day has long been recognized as one of the best. It is but just to say that its efficacy has recently been called in question by some of our best clinicians. Warm sulphur baths have been found useful. Atropine or morphine and atropine may be given hypodermically for relief of the colic. Cocaine hypodermically has also been successfully used to relieve both the pain and constipation. Calomel and gamboge, castor oil, or olive oil, may be given to overcome the constipation. Belladonna or hyoscyamus may be added with advantage to either of the cathartics. Alum sometimes acts well as a cathartic in these cases. As a prophylactic measure tea as a drink and a dose of sulphur occasionally, both act by precipitating lead from solution."—(Riley's *Toxicology.*)

STATE BOARD EXAMINATION QUESTIONS

Mississippi State Board of Medical Examiners.

ANATOMY.

1. Describe external iliac artery. Give relations. Name branches.
2. Trace the blood from the big toe to the retina of the eye.
3. Give origin, insertion, and function of deltoid muscle.
4. Describe sciatic nerve. Give divisions of same. Name muscles supplied.

5. Describe hip-joint. Give kind of articulation. Name ligaments of same.
6. Describe fifth cranial nerve. Give its distribution and function.
7. Describe portal system.
8. Describe external carotid artery. Give relations. Name branches.

PHYSIOLOGY.

1. Name the cranial nerves that are exclusively motor in function, and describe any one of them.
2. Describe in detail the pneumogastric nerve.
3. Name and give function of the digestive secretions naming the active agents in each.
4. Describe the heart sound, and give causes for the sounds.
5. Define blood pressure, and give method for determining it.
6. Locate the respiratory center.
7. Name the secretions and excretions.
8. Name six abnormal constituents of urine.

CHEMISTRY.

1. Name four elements that are gases and give symbol for each.
2. What is the molecular weight of water?
3. Give the chemical formula for each of the following: (*a*) Ammonia. (*b*) Ferric chloride. (*c*) Hydrocyanic acid. (*d*) Laughing gas. (*e*) Ethyl alcohol. (*f*) Benzene.
4. Complete the following equations: $HNO_3 + KOH$ equals.
5. Write equation showing how slaked lime is formed.
6. What elements are the most common constituents of organic compounds?
7. What is the simplest saturated hydrocarbon and its graphical formula?
8. What is Fehling's solution and its use?

MATERIA MEDICA.

1. Give habitat, common name, and one official preparation with dose of (*a*) digitalis; (*b*) gelsemium; (*c*) belladonna; (*d*) aspidium; (*e*) physostigma; (*f*) colocynth; (*g*) veratrum viride.
2. Name two commonly used derivatives of morphine and give dose of each.
3. Name the ingredients of (*a*) Dover's powder; (*b*) Seidlitz powder; (*c*) black wash; (*d*) Carron oil; (*e*) Fowler's solution.
4. Why are the salts of the alkaloids generally used

instead of the alkaloids themselves? (*b*) Name and give dose of five alkaloidal sulphates.

5. Mention ten drugs, any one of which when taken internally may produce skin eruption.

6. Give the best chemical antidote for (*a*) arsenous acid; (*b*) bichloride of mercury; (*c*) iodine; (*d*) phosphorus; (*e*) all alkaloids.

7. By what rule would you determine the dose of any medicine for a child?

8. How much of any drug is contained in one ounce of a 5 per cent. solution of such drug.

HYGIENE.

1. Describe a sanitary school building.

2. How would you manage an epidemic of typhoid fever in a town of three hundred or more?

3. In what way do the germs of disease enter our bodies? Describe the five most important.

4. Give hygienic management of a case of tuberculosis in a home.

5. What diseases are transmitted through human excreta?

6. What diseases may be transmitted through milk? What precautions should be taken to prevent these?

7. Discuss briefly the hygiene of infant feeding.

8. What is soil pollution? How is hookworm disease contracted?

OBSTETRICS.

1. Give diagnosis and treatment of extra-uterine pregnancy after rupture.

2. Give cause and treatment of mastitis.

3. Give symptoms, diagnosis and treatment of placenta prævia.

4. What are the uses of the liquor amnii during pregnancy? During labor?

5. How would you deliver a child, when face is presenting with chin posterior?

6. To prevent laceration of the perineum, describe the proper method of delivery of the head.

7. Give treatment of pregnancy complicated with nephritis.

8. Give treatment of pernicious vomiting of pregnancy.

PATHOLOGY.

1. Describe the difference between an embolus and thrombus, and where do you most frequently find an embolus?

2. Explain what is meant by the terms physiologic

and pathologic leucocytosis? State whether leucocytosis occurs in the following diseases: typhoid fever, malarial fever, pneumonia, acute miliary tuberculosis.

3. By what methods would you make a diagnosis of tubercular lesions?

4. What general pathological condition characterizes chronic alcoholism?

5. What pathological conditions do we find in the different stages of lobar pneumonia?

6. Give the gross pathology of amebic dysentery. Describe the organism giving rise to it, and give pathological condition of the liver associated with it.

7. What abnormal products do you find in diabetes mellitus? In chronic parenchymatous nephritis?

8. Name and explain the cardinal symptoms of inflammation. State the terminations of inflammation.

SURGERY.

1. Define inflammation and give symptoms.

2. Differentiate between septicemia and pyemia.

3. Give varieties of talipes and give treatment for one variety.

4. Give advice on a case of appendicitis, initial attack; you are called in on the third day.

5. In closing a wound give two cardinal principles that must be observed to get union by first intention.

6. Give symptoms and treatment for dislocation of inferior maxilla.

7. Name the signs of a fracture.

8. Name the coverings that would be cut in operating for an oblique inguinal hernia.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

MISSISSIPPI STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *external iliac artery* arises at the point of bifurcation of the common iliac artery, and runs along the brim of the true pelvis to Poupart's ligament, where it enters the thigh as the femoral artery. *In front* of it are the intestines, peritoneum, iliac fascia, spermatic vessels, genital branch of genitocrural nerve, and deep circumflex iliac vein; *behind it* are the external iliac vein (on the right side), and the psoas magnus muscle; on the *outer side* are the psoas magnus and the iliac fascia; and on the *inner side* is the external iliac vein. Further, on the right side the

ureter frequently crosses the upper part of the artery. *Branches:* The deep epigastric and deep circumflex iliac.

2. *From the big toe to the retina of the eye* the *blood* will pass through the following veins: Dorsal digital, internal saphenous (or plantar digital, plantar metatarsal, anterior tibial, popliteal), femoral, external iliac, common iliac, inferior vena cava, to right auricle of heart; then to right ventricle, through pulmonary artery, pulmonary veins, to left auricle and left ventricle, and through the following arteries: aorta, common carotid, internal carotid, ophthalmic, and arteria centralis retinæ.

3. DELTOID. *Origin:* From the outer third of anterior border and upper surface of the clavicle, from the outer margin and upper surface of the acromion process, and from the lower edge of the spine of the scapula. *Insertion:* Into the deltoid impression on the middle of the outer side of the shaft of the humerus. *Action:* It raises the arm from the side so as to bring it at right angles with the body; its anterior fibers draw the arm forward; its posterior fibers draw the arm backward.

4. *The great sciatic nerve* arises from the sacral plexus and passes out of the pelvis through the great sacrosciatic foramen, below the pyriformis muscle: it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus, and adductor magnus *muscles*.

5. The *hip-joint* is an enarthrodial joint, formed by the head of the femur and the acetabulum. The articular surfaces are covered with cartilage. Near the center of the head of the femur is attached the ligamentum teres. The *ligaments* are: (1) The capsular, which embraces the margin of the acetabulum above, and the neck of the femur below. (2) The ileofemoral or Y ligament, which passes obliquely across the front of the joint, and is attached above to the anterior inferior spine of the ileum, and below to the anterior intertrochanteric line. (3) The ligamentum teres. (4) The cotyloid ligament, which deepens the acetabulum, and bridges over the cotyloid notch, being there called (5) the transverse ligament. The joint has a very extensive synovial membrane. It is capable of the following movements: Flexion, extension, abduction, adduction, circumduction, and rotation.

FIFTH CRANIAL NERVE. *Origin:* (1) *Superficial*, from the side of the pons Varolii; (2) *Deep* (sensory root), from the medulla, and upper part of cord; (motor root) from floor of fourth ventricle, and side of the aqueduct of Sylvius.

Distribution: First or ophthalmic branch supplies sensation to conjunctiva and skin of upper eyelid, cornea, skin of forehead and nose, lachrymal glands, mucous membrane of nose. *Second, or superior maxillary branch*, supplies sensation to skin and conjunctiva of lower lid, nose, cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior maxillary branch*, supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, lower lip and skin of the lower part of the face. This branch, in addition, supplies motion to the muscles of mastication (masseter, temporal, external pterygoid, internal pterygoid), also to mylohyoid and anterior belly of digastric.

7. *The portal system.* The veins of the portal system collect the blood from the digestive tract. They form a trunk, the *vena portæ*, which enters the liver and breaks up into small branches in its substance. The following veins form the portal system:

Inferior mesenteric: drains rectum, sigmoid, flexure, and descending colon. It lies to the left of its artery, and passing behind transverse part of the duodenum and the pancreas, and over left kidney, opens into the splenic vein. (The hemorrhoidal branches inosculate with the hemorrhoidal branches of the internal iliac.)

Superior mesenteric: drains small intestines, cecum, ascending and descending colon. It passes upwards in front and to right of superior mesenteric artery, in front of transverse part of duodenum, and behind neck of pancreas joins the splenic vein at the upper border of the pancreas to form the portal vein.

Splenic: commences in five or six branches in hilum of spleen; these unite to form a trunk which passes below splenic artery behind upper border of pancreas from left to right, and in front of aorta; joins superior mesenteric at a right angle.

The gastric or coronary: a large vein accompanying coronary artery from right to left along lesser curvature of stomach to cardia, where it reaches esophageal tributaries, and, passing to right behind lesser sac, opens into the vena portæ.—(*Aids to Anatomy.*)

The *portal vein* is formed by the union of the splenic and superior mesenteric veins in front of the right crus

of diaphragm and inferior vena cava, and behind the neck of the pancreas. Passes up behind first part of duodenum and then between the layers of the small omentum, behind and between the common bile-duct and hepatic artery, the duct being placed on the right and artery on the left, to transverse fissure of liver, where it divides into right and left branches to corresponding lobes, and also gives an offset to the Spigelian lobe. Connected with the branch to the left lobe are in front the *obliterated umbilical vein* and behind the *ductus venosus*, the remains of a fetal connection with the inferior vena cava.—(*Aids to Anatomy.*)

8. The *external carotid artery* arises at the point of bifurcation of the common carotid artery, opposite the upper border of the thyroid cartilage, passes upwards and ends in the substance of the parotid gland behind the neck of the lower jaw, where it divides into the superficial temporal and internal maxillary arteries. *Relations: In front*, skin, fascia, platysma, sternomastoid, lingual and facial veins, digastric, stylohyoid, hypoglossal nerve, and parotid gland; *behind*, superior laryngeal nerve, styloglossus, stylopharyngeus, glossopharyngeal nerve, and parotid gland; *externally*, the internal carotid artery; *internally*, hyoid bone, pharnyx, superior laryngeal nerve, parotid gland.

The branches of the external carotid artery are: Superior thyroid, lingual, facial, occipital, posterior auricular, ascending pharyngeal, superficial temporal, and internal maxillary.

PHYSIOLOGY.

1. *Cranial nerves that are exclusively motor in function:* Motor oculi, trochlear, abducens, facial, spinal accessory, and hypoglossal.

The *third cranial nerve* (motor oculi) arises from the inner side of the crus cerebri, in front of the pons, and from the floor of the aqueduct of Sylvius. It enters the cavernous sinus and then passes forward to enter the orbit through the sphenoidal fissure. While in the sphenoidal fissure it divides into two branches. It is the motor nerve for the muscles of the eyeball, and is distributed to all of these muscles except two. It supplies the superior rectus, levator palpebræ superioris, internal rectus, inferior rectus, and inferior oblique muscles.

2. *Pneumogastric nerve. Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Course:* Outward across the flocculus, to jugular foramen through which

it passes; here it is joined by the accessory portion of the spinal accessory nerve. As it goes down the neck, it lies in front of the *rectus capitus anticus* major and longus colli muscles. It passes in the carotid sheath behind and between the artery and vein. In the thorax the nerve on each side runs a different course. The *right* passes between the subclavian artery and vein, by side of trachea to root of lung, behind esophagus, through esophageal opening in diaphragm to posterior surface of stomach. The *left* passes between the subclavian and carotid arteries, in front of arch of aorta to root of lung, along anterior surface of esophagus, through diaphragm, to anterior surface of stomach. *Distribution* is shown by the names of the branches: Meningeal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary, esophageal, and gastric. *Function:* It supplies (1) *motor* influence to the pharynx and esophagus, stomach, and intestines, to the larynx, trachea, bronchi, and lungs; (2) *sensory* and, in part (3) *vasomotor* influence, to the same regions; (4) *inhibitory* influence to the *heart;* (5) *inhibitory* afferent impulses to the *vasomotor center;* (6) *excito-secretory* to the salivary glands; (7) *excito-motor* in coughing, vomiting, etc.

3. The secretions of the alimentary canal are: Saliva, gastric juice, pancreatic juice, bile, and succus entericus. Of these the gastric juice has an acid reaction; the others, alkaline.

The functions of the saliva are: (1) To moisten the mouth, (2) to assist in the solution of the soluble portions of the food, and thus (3) to administer to the sense of taste, (4) to lubricate the bolus of food, and thus (5) to facilitate the acts of mastication and deglutition, and (6) to change starches into dextrin and sugar.

The functions of the gastric juice are: (1) to change proteids into proteoses and peptones, and (2) to curdle the casein of milk.

The functions of the pancreatic juice are: (1) To change proteids into proteoses and peptones, and afterwards decompose them into leucin and tyrosin; (2) to convert starch into maltose; (3) to emulsify and saponify fats; and (4) to cause milk to curdle.

The functions of the bile are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of

metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

The functions of the succus entericus are: The secretion of enterokinase, secretin, and erepsin, which assist the pancreatic juice in digestion.

SECRETIONS.	ACTIVE PRINCIPLES.	FUNCTIONS.
Salivary	Ptyalin.	Changes starches into dextrin and sugar.
Gastric	Pepsin.	Changes proteids into proteoses and peptones in an acid medium.
	A curdling ferment.	Curdles the casein of milk.
Pancreatic	Trypsin.	Changes proteids into proteoses and peptones, and afterwards decomposes them into leucin and tyrosin; in an alkaline medium.
	Amylopsin.	Converts starches into maltose.
	Steapsin.	Emulsifies and saponifies fats.
	A curdling ferment.	Curdles the casein of milk.
Intestinal	Invertin.	Converts maltose into glucose.

4. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged, the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.*

The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage.

The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) The vibration and closure of the auriculo-ventricular valves, (2) the muscular

sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall.

The *second* sound is caused by the vibration due to the closure of the semilunar valves.

5. *Blood pressure* is the pressure of the blood due to the ventricular systole, the elasticity of the arterial walls, and the resistance of the capillaries. The normal arterial blood pressure varies; the systolic pressure being about 120 to 150 mm. of mercury, and the diastolic from about 90 to 120 mm. of mercury. Blood pressure is *maintained* by the contraction of the heart, the peripheral resistance, and the elasticity of the arterial walls.

Blood pressure is estimated by a syhygmomanometer.

"The individual whose blood pressure is about to be recorded should be placed in such a position that his heart, the artery the blood pressure of which is to be determined, and the manometer are at the same level. It is usual to record the pressure in the brachial artery. The india-rubber bag of the instrument should be wrapped round the bared arm, the metal covering of the bag should then be adjusted, and firmly strapped in position. The india-rubber tube leading from the bag is then adjusted to the proximal limb of the U-shaped manometer which contains mercury. The experimenter places the index finger of his left hand over the radial pulse of the subject, and with his right hand he compresses the syringe and so drives air into the india-rubber tube and the india-rubber bag around the individual's arm. The pressure of the air in the bag around the arm is recorded by movement of the mercury from the proximal to the distal limb of the manometer. The operator keeps on pressing the syringe until oscillatory movements are seen at the surface of the mercury in the distal limb of the manometer; the mean point of maximum oscillations registers the diastolic pressure. If the pressure in the bag is still further increased, the oscillations diminish in amplitude and finally disappear, and at this point the pulse can no longer be felt at the wrist. The height of the mercury supported then registers the amount of systolic pressure. It will then be noted that the mercury has descended in the proximal limb of the manometer, and has ascended in the distal limb of the manometer: the difference between the two mercurial levels will be the blood pressure of the brachial artery. The normal systolic pressure in man is about 120 mm. Hg, and the diastolic pressure about 100 mm. Hg. In women the pressures are about 10 per cent. less. In children the

systolic pressure may be as low as 90 mm. Hg, with a diastolic pressure of about 80 mm. Hg. (R. Hutchison.)

6. The respiratory center is situated in the lowest part of the floor of the fourth ventricle at the calamus scriptorius.

7. *Secretions:* Sebum, mucus, serous fluid, tears, saliva, gastric juice, succus entericus, pancreatic juice, bile, milk, sweat, urine, seminal fluid, and the various internal secretions.

Excretions: Urine, carbon dioxide, sweat.

8. *Six abnormal constituents of urine:* Albumin, sugar, blood, pus, bile, and indican (in excess).

CHEMISTRY.

1. *Four elements that are gases:* Hydrogen, H; oxygen, O; chlorine, Cl; nitrogen, N.

2. *The molecular weight of water:* H = 1, O = 16; $H_2O = 18$.

3. Ammonia, NH_3; Ferric chloride, Fe_2Cl_6; Hydrocyanic acid, HCN; Laughing gas, N_2O; Ethyl alcohol, C_2H_5OH; Benzene, C_6H_6.

4. $HNO_3 + KOH = KNO_3 + H_2O$.

5. $CaO + H_2O = Ca_2H_2O_2$.

6. Carbon, hydrogen, oxygen, nitrogen.

7. The simplest saturated hydrocarbon is methane, CH_4.

8. Fehling's solution is a mixture of copper sulphate, caustic soda and potassium tartrate. It is used as a reagent in testing urine for sugar.

MATERIA MEDICA.

1. DIGITALIS. *Habitat,* Europe; *common name,* foxglove; tincture of digitalis, dose 15 minims.

GELSEMIUM. *Habitat,* Southern United States; *common name,* yellow jasmine; tincture of gelsemium, dose 8 minims.

BELLADONNA. *Habitat,* Europe and Asia Minor; *common name,* deadly night shade; tincture of belladonna leaves, dose 8 minims.

ASPIDIUM. *Habitat,* Europe, Northern America and Northern Asia; *common name,* male fern; oleoresin of aspidium, dose 30 grains.

PHYSOSTIGMA. *Habitat,* tropical Western Africa; *common name,* Calabar bean, or ordeal bean; tincture of physostigma, does 15 minims.

COLOCYNTH. *Habitat,* Southern Asia and the countries bordering the Mediterranean Sea; *common name,* bitter apple; extract of colocynth, dose ½ grain.

VERATRUM VIRIDE. *Habitat,* North America; common

name, hellebore; tincture of veratrum, dose 15 minims.

2. *Two derivatives of morphine: Apomorphine;* emetic dose of apomorphine hydrochloride 1/10 grain. *Heroin*, dose 1/18 grain.

3. *Dover's powder* contains ipecac 10, powdered opium 10, and sugar of milk 80.

Seidlitz powder contains potassium and sodium tartrate 120 grains, sodium bicarbonate 40 grains and tartaric acid 35 grains.

Black wash contains 30 grains of calomel in 10 ounces of lime water.

Carron oil contains equal parts of lime water and linseed oil.

Fowler's solution contains arsenous acid 1, potassium bicarbonate 2, compound tincture of lavender 3, and distilled water to 100.

4. The salts of the alkaloids are, as a rule, soluble in water, whereas the alkaloids are but slightly soluble in water. For this reason the salts are more generally used than the alkaloids themselves.

Five alkaloidal sulphates: Morphine sulphate, dose 1/4 grain; strychnine sulphate, dose 1/64 grain; atropine sulphate, dose 1/160 grain; quinine sulphate, dose 4 grains; codeine sulphate, dose 1/2 grain.

5. *Ten drugs whose internal use may cause a skin eruption:* Bromine and the bromides, iodine and the iodides, cubebs, copaiba, salicylic acid, quinine, turpentine, antipyrin, belladonna, chloral.

6. *Chemical antidote* for *arsenous acid*, freshly prepared solution of ferric hydroxide; for *bichloride of mercury*, white of egg, or milk; for *iodine*, starch; for *phosphorus*, no chemical antidote, but old French oil of turpentine is recommended; for *alkaloids*, tannin.

To determine the proper dosage for a child: Let x = the age of the patient; then $\frac{x}{x+12}$ = the fraction of the adult dose which the patient should receive. Thus, a patient four years old should receive $\frac{4}{4+12} = \frac{4}{16} = \frac{1}{4}$ of an adult dose.

8. One ounce = 480 grains; a 5 per cent. solution will contain 5/100 or 1/20 of 480 grains = 24 grains.

HYGIENE.

1. A SANITARY SCHOOL BUILDING. "The *site* of a school building must be well drained, either by nature or artificially; it must be convenient of access; it

should not be near enough to railroads or noisy factories to allow the noise to interfere with work; it should have ample playground space; it should have some shade; the surface should be graveled or turfed; walks must connect the school house with the street or road and with outhouses and water supply. The *foundation* must be impervious to soil-water in order that capillarity may not dampen the walls. They should be of non-porous natural stone, hard-burned brick or concrete, and if of concrete must have a layer of tarred felt, tarred paper or impervious stone or brick interposed between the foundation and the superstructure. If there is a *basement* it should rise sufficiently high above the ground for light and air to penetrate to every part of it, and should never be allowed to become a dump for refuse of any kind. If no basement is provided, the foundation walls should be pierced in appropriate places and guarded with gratings, in order to allow a circulation of air below the floors. *Cloak-rooms* must always be provided in order to avoid the stuffy and disagreeable odor of clothing in damp weather. In the country, shelves for dinner pails should also be provided. *Toilets* must be separate for the sexes, well screened, well painted or whitewashed, and kept clean. If water-closets are used, a type should be selected which can easily be scrubbed, and an automatic flush is desirable. Urinals must be placed in the toilets allotted to boys. *Wash-rooms.*—Children should be afforded an opportunity for cleansing the hands and face after play or visits to the toilet. For this, if piped water is available, the ordinary porcelain basins with run-off to the sewer connection should be installed. In case it is not available, ordinary granite or enameled basins, with a water supply in buckets or tanks should be possible to any school. Paper towels or individual towels brought by the children must be used. The use of roller towels is an abomination. *Water Supply.*—A supply of water under pressure is necessary, which will provide not only water for drinking and washing, but for water-closets, the outflow from which can be purified by a septic tank before its final disposal. *Space.*—Not less than 225 cubic feet of space must be allotted to each person in the schoolroom, including the teacher. Twelve-foot ceilings are best for all purposes. *Ventilation.*—Whatever means are used must provide for a complete change of air in 15 to 20 minutes. This is best tested by using the "bee-smoker," which fills the air with light smoke from burning rags,

and if the air is completely clear in the time named the ventilation may be regarded as satisfactory. Whatever system of *heating* is employed should maintain the temperature of every part of the school room between 65° and 70° F., with a relative humidity of at least 40 per cent. Should the temperature fall below 60° the school must be dismissed at once. *Humidity.*—Some means, even if only the placing of pans of water on stoves or radiators, must be provided for adding to the moisture in the air. The room should be *lighted* from one side only, or by properly softened sky-lights, and the lighting area should not be less than one-sixth of the floor area. Prismatic glass in the upper sash is an advantage, since it diffuses the light to the opposite side of the room. *Seats* must be adjustable to the bodies of the children. It is nothing short of criminal to compel the child to adjust itself to the seat. Good work cannot be done by an uncomfortable child, and lasting eye-trouble or bodily deformity such as spinal curvature may come from the practice. *Blackboards* should be always dull-finished. A glossy blackboard is unnecessarily hard on the eyes. Blackboards and erasers should not be cleaned while school is in session, and erasers should be dusted outside. The chalk racks should be cleaned each evening by the janitor."—(Gardner and Simonds' *Practical Sanitation.*)

2. To prevent the spread of typhoid fever: Flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over. Further, each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food.

3. *Avenues of entrance for the germs of disease:* Skin and mucous membrane, digestive tract, respiratory tract, genital tract, conjunctiva, placenta.

4. *Hygienic precautions to be taken in treating a case of tuberculosis:* "The patient's quarters should be free from dust, and admit of his spending many hours daily in the open air in all weathers, properly sheltered,

and, if very ill, lying wrapped in a hammock or reclining chair. His bedroom should be well aired at night, draughts being avoided. The room should be uncarpeted and free from hangings. It should be often cleaned and periodically disinfected. All sputum should be collected in paper spit-cups, which should be burned daily. Smoking should be forbidden. Harm is done by any exercise which results in fatigue, and while fever exists it should not be attempted at all. Patients should be taught the necessity of practising lung gymnastics and breathing only through the nose, which should be kept clear and free from occlusion by secretions, or an hypertrophied catarrhal mucosa. . . . The clothing should be woolen, but not too heavy, or sweating is increased; and a flannel nightgown and loosely knit leggings should be worn at night in cool weather. The skin should be cleansed by daily sponge-baths of lukewarm alcohol and water." (Thompson's *Practical Medicine.*)

5. *Diseases transmitted through human excreta:* Actinomycosis, bubonic plague, chickenpox, cholera, amebic dysentery, bacillary dysentery, typhoid.

Diseases specially liable to be conveyed by the ingestion of milk: Tuberculosis, typhoid fever, scarlet fever, diphtheria, tonsillitis, cholera, and gastrointestinal disorders.

The milk may come from a diseased cow; it may become contaminated by the milker, the container, the surroundings, the water used to wash the cans or to adulterate the milk; or it may become contaminated at the dealer's or purchaser's house by being left uncovered, exposed to flies, etc., or by not being kept in a cool place. The only way to prevent the transmission of disease by milk is to insist on a thorough inspection of all dairies and sources of milk supply, and to educate the public in the care of milk between the time of its purchase and its consumption. The inspection should include: the color, reaction, specific gravity, sediment, taste, odor, acidity, total quantity of solids and of water; the percentage of cream, fats, lactose, casein, and ash; the presence or absence of preservatives, coloring matter, added solids, dilution, pathogenic microorganism, dirt, or other foreign matter. There should also be thorough investigation as to its source, the cows and their environment, the method employed in caring for, milking, storing, and transporting the milk.

Essentials for the production and preservation of pure dairy milk: Vaughan's rules are as follows: "(1) The cows should be healthy, and the milk of any

animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60° F., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered, during the summer, in refrigerated cans or in bottles about which ice is packed during transportation. (8) When received by the consumer it must be kept in a clean place, and at a temperature some degrees below 60° F."

7. "If the mother cannot nurse her infant, it must be nourished by a wet-nurse. When none can be obtained, give cow's milk one part (by measure) or two parts of water and add milk sugar, 3 iv. to each pint of the mixture, the proportion of milk to be increased with age. When this food disagrees, and the child passes lumps of undigested curd, one-third of the water may be exchanged for lime-water. The water must be sterilized by boiling, and the milk not by boiling, which impairs its nutritive value, but by Pasteurization—*i. e.* by keeping it continuously for thirty minutes at a temperature of 167° F. It is of the utmost importance that nipples, bottles, and vessels in which the food is prepared should be kept aseptically clean. They must not be used twice without being thoroughly cleansed—the bottles and vessels scalded and the nipples immersed in a solution of boric acid. The best rule as to how much of the milk-mixture should be given the child at one time, is to give it as much as it will readily take; if it rejects any, give it less next time." (King's *Manual of Obstetrics.*)

8. Soil pollution consists of the urine and droppings of animals, the carcasses of animals that have died, and

vegetable matters in various stages of decay, also sewage and dead bodies.

Prophylaxis of hook-worm disease: Children and adults should be made to wear shoes; proper toilet facilities should be provided, and their use enforced; bathing or wading in shallow water should be forbidden; a proper water supply should be available for drinking purposes; and prompt recognition and treatment of all cases should be encouraged.

OBSTETRICS.

In *extrauterine pregnancy*, there will be signs of early pregnancy, hypogastric or inguinal pains, probable history of a previous sterility, probable expulsion of decidual membrane or shreds, softening of the cervix, enlargement of the uterus, presence of a distended tube, contractions of the wall of the gestation sac; if rupture occurs, there will be sudden, excruciating pains over the lower abdomen and on the affected side, shock, collapse, and symptoms of internal hemorrhage. The *treatment after rupture* is—laparotomy. "After thorough cleansing and sterilization of the abdomen and pubes, as well as of the instruments and hands of the operator and assistants, the bladder is emptied and the patient anesthetized. An incision 3 inches long is then made in the median line above the pubes down to the peritoneum, any bleeding vessels being twisted before opening the peritoneal cavity. The peritoneum is then incised; the intestine kept back by pads of cotton or gauze wrung out of sterilized water; the operator's fingers bring out the distended tube and ovary at the incision after having freed them from any existing adhesions; the pedicle is then transfixed by a double ligature of sterilized silk, and each half of it tied securely according to surgical rule. The pedicle is cut, and the entire mass—the Fallopian tube, with the cyst, fetus, ovary, and effused blood, removed, extra care being taken, in the ruptured cases, to quickly secure the bleeding vessels of the ruptured tube from further hemorrhage. The pads are then withdrawn and the abdominal incision closed and dressed in the usual manner. In case of threatened collapse from hemorrhage during the operation, the peritoneal cavity may be flooded with a 1 per cent. sterilized solution of common salt at a temperature of 100° F., a quart of this solution having been previously prepared. It is rapidly absorbed by the peritoneum, and acts as a restorative—like transfusion."—(King's *Obstetrics.*)

2. MASTITIS. *Etiology:* Infection, generally due to

handling; cracked or sore nipples and overactivity of the gland with retained secretion are predisposing causes. *Treatment:* This consists in resting the part; supporting it, applying a hot boracic acid fermentation; nursing from the affected breast should be stopped at once.

Prophylactic measures consist in not touching the breasts (by doctor or nurse or patient) without thoroughly clean hands; by washing and drying the nipple before and after nursing, and by proper attention to hygienic conditions before labor, and the nipple and breasts being preserved from pressure.

3. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Varieties:* (1) *Central,* when the placenta completely covers the os. (2) *Partial,* when the placenta overlaps the os. (3) *Marginal* or *lateral,* when the placenta reaches the margin of the os but does not overlap it. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Dangers:* Hemorrhage, sepsis, death of the mother, death of the fetus. *Treatment:* stop the hemorrhage by a tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

4. LIQUOR AMNII. *Functions:* (*a*) *During pregnancy:* (1) As a protection to the fetus against pressure and shocks from without. (2) As a protection to the uterus from excessive fetal movements. (3) It distends the uterus and thus allows for the growth and movements of the fetus. (4) It receives the excretions of the fetus. (5) It surrounds the fetus with a medium of equable temperature, and serves to prevent loss of heat. (6) It prevents the formation of adhesions between the fetus and the walls of the amniotic sac. (7) It has been supposed, by some, to afford some slight nutrition to the fetus. (*b*) *During labor:* It acts as a fluid wedge, and dilates the os uteri and the cervix; it also slightly lubricates the parts.

5. "*In mento-posterior positions,* endeavor to secure anterior rotation of the chin when it fails to take place spontaneously. The several methods of attempting this are: 1. Press the forehead backward and upward during a pain, so as to make extension more complete, and thus cause the chin to dip lower down and touch the anterior inclined plane upon which it may glide forward. 2. Put a finger in the mouth, or on the outside

of the lower jaw, and draw the chin forward during a pain. 3. Apply the straight forceps and twist the chin to the pubes. 4. Apply the vectis, or one blade of the forceps, under the most posterior cheek, and over the anterior inclined plane, thus, as it were, thickening the latter, so as to make it reach the malar bone and constitute a *point d'appui* which the chin can touch and so glide forward. Should these attempts to secure anterior rotation fail, an effort may be made with the hand, vectis, or fillet, to bring down the occiput and convert the face into a head presentation. In order to succeed in this maneuver the membranes should be unbroken, the os uteri dilated, the face not so deeply engaged that it cannot be lifted to or above the pelvic brim, and an anesthetic administered. Again, failing in this way to produce anterior rotation, the head, if it be not too deeply engaged in the pelvis, and have not passed through the os uteri, may be pushed back, and the child be delivered by podalic version. Should none of these methods be practicable and the head become impacted in the pelvis with the chin toward the sacrum, the only resort is craniotomy. Attempts have been made in these cases to deliver by forceps after lateral incision of the perineum, but they can only succeed when either the child is small or the pelvis over-large. Usually the child's life has been so far imperiled by delay and its consequences that craniotomy may be done without compunction. Possibly symphyseotomy may prove useful in these cases in future. In all cases of face presentation special care is necessary to avoid rupture of the perineum" (King's *Manual of Obstetrics*).

6. *To protect the perineum:* The patient should be restrained from bearing down unduly; extension of the head must be retarded, and the central part of the occiput must be allowed to be born first; pressure must be made with the hand between the coccyx and the anus; when the perineum has had time to stretch, extension and expulsion are allowed; after the birth of the head care must be taken to see that the perineum is not torn by the birth of the shoulders.

7. *Treatment of pregnancy complicated with nephritis:* "Prophylaxis is of the first importance. The urine should be examined every month in the first six months of every pregnancy, no matter how normal it may seem, and every fortnight in the last three months. If albumin is present, the amount should be estimated in an Esbach tube, and the urea in a Doremus ureometer. The total quantity of urine per diem should also be ascertained. The principles of treatment are

to relieve the kidneys by free elimination by the bowels and skin, and by diminishing the nitrogenous part of the dietary; and at the same time to prevent any further interference with the renal functions by guarding against cold. In mild cases where the albuminuria is the sole symptom, the patient should be warned to rest and guard against cold. The diet should be restricted to milk food, with bread and butter, and a little fish or chicken once a day, and the bowels should be made to act freely once every day. Where there are, in addition, symptoms such as edema or headache, the patient should be kept in bed, the diet even more rigidly restricted, and nothing but milk foods given for some days. The bowels should be briskly purged by a hydragogue, such as jalap, and the kidneys flushed out with diluent drinks. This treatment must be continued until the symptoms have disappeared, although it is rare for the urine to clear up altogether. A little fish and chicken, and some light fruits and vegetables may then be added to the diet, but the regular free action of the bowels must be continued. In more severe cases the skin functions must be stimulated in addition by the use of hot packs. The diet also should be nothing but plain milk and diluent drinks. Hot salines per rectum help to flush out both bowels and kidneys. If the condition grows worse in spite of treatment, it argues either a very severe toxemia, or severely damaged kidneys. The outlook in either case is so bad, owing to the probable onset of eclampsia, that the pregnancy should be terminated, particularly as the prospects of obtaining a healthy living child are remote. This interference becomes urgent if signs of drowsiness indicate approaching coma, or sickness and epigastric pain suggest the near onset of eclampsia. The obstetric treatment then consists in emptying the uterus. Where there is no great urgency this should be done by Krause's method of induction of premature labor. In urgent cases some method of *accouchement forcé* must be employed, the choice depending upon the condition of the cervix, and on the degree of urgency" (Johnstone's *Text-book of Midwifery*).

8. *Pernicious vomiting of pregnancy*. "The treatment consists in rest in bed in a quiet, darkened room and the administration of easily digested foods, such as milk, broths, eggs, etc. A careful search must be made for some local exciting cause, and if any such condition is found, it should receive appropriate treatment. Sexual intercourse should be interdicted. The bowels should be kept freely open. Sodium bromide, camphor,

cocaine, silver nitrate, cerium oxalate, hyoscine hydrobromide, antipyrine, etc., are among the drugs used internally. Rectal alimentation may be necessary, and, as a last resort, dilatation of the cervix and internal os, or abortion may be performed (*Pocket Cyclopedia*).

PATHOLOGY.

1. *Thrombus* is a blood-clot formed within the heart or blood vessels during life.

Embolus is a clot or other substance brought by the blood current, and forming an obstruction where it lodges.

Emboli are most frequently found in the following arteries: Pulmonary, renal, splenic, cerebral, iliac, axillary, mesenteric and coronary.

2. A *physiological leucocytosis* is a leucocytosis which is found in certain physiological conditions; it is generally moderate and of brief duration. It is found in the newborn, after parturition, after exertion, after a cold bath or massage, during pregnancy, and during digestion.

A *pathological leucocytosis* is a leucocytosis which is found in certain pathological conditions; it is generally found in inflammatory, toxic, and infectious conditions. As a rule, the polynuclears are increased.

Of the diseases mentioned there is a leucocytosis present in: Pneumonia. It is absent in: Typhoid, malaria, and acute miliary tuberculosis.

3. Tuberculous lesions may be diagnosed by the various tuberculin tests, such as those of Koch, von Pirquet, Calmette, and Moro.

4. In *chronic alcoholism* there may be found peripheral neuritis, meningitis, catarrh of stomach, cirrhosis of liver, arteriosclerosis, and granular kidney.

5. Acute Lobar Pneumonia. "It is convenient to describe four stages, those, namely, of (1) hyperemia or engorgement, (2) red hepatization, (3) gray hepatization, and (4) resolution. *First stage or splenization.*—The lung is injected, dark red, and heavy, and pits under the finger; on pressure, there exudes a frothy serum tinged with blood and slightly aërated. The lung still floats in water. *Second stage or red hepatization.*—The part involved is solid and friable, presents a granular or red granite appearance, and sinks in water. The alveoli are filled with a coagulated exudation which shows under the microscope fibrin, leucocytes, red corpuscles, proliferated alveolar epithelium, and pneumococci. *Third stage or gray hepa-*

tization.—The lobe has now the appearance of gray granite, the lung substance is softer and more friable; on pressure, a dirty purulent fluid exudes. The gray appearance is due to four factors: (1) Decolorization of the red blood corpuscles; (2) obliteration of the alveolar blood vessels from pressure; (3) fatty degeneration of the coagulated material; (4) great infiltration of leucocytes. A more advanced stage, in which the lung tissue is bathed in purulent fluid, is known as purulent infiltration. It is probably inconsistent with life. *Fourth stage or resolution.*—Resolution of the inflammatory exudation is brought about principally by absorption (autolysis), but partly by liquefaction and expectoration. Pneumonia may affect a lobe, or the whole of a lung, or it may attack both lungs. Double pneumonia occurs in about 10 per cent. of cases. Different parts of the same lung may at the same time show different stages. There is always some degree of pleural inflammation over the affected area. Moderate enlargement of the spleen is very common" (Wheeler and Jack's *Practice of Medicine*).

6. "In *amebic dysentery* the lesions are chiefly seated in the large intestine. They present: (a) Small gelatinous swellings of the mucosa, with partial ulceration; (b) Necrosis and sloughing of the underlying tissues. The ulcers of amebic dysentery thus have undermined edges. The amebæ are found in the ulcerating mucosa, but more abundantly in the tissues beyond the ulcerated area (submucous or muscular coat), where they set up edema and necrosis. Later, along with the ulcers, cicatrices leading sometimes to partial stricture, may be found. Hepatic abscess, usually single, and hepato-pulmonary abscess, are common complications. Amebæ are sometimes found in the portal capillaries. The *ameba* is a rounded cell with a clear outer ectoplasm, and a granular endoplasm. It has a rounded or oval eccentric nucleus, and measures from 10 to 15 μ in diameter. On the warm stage it shows active ameboid movement. In the resting stage it forms a cyst or cysts, and in this state resists drying for a long time. The organisms are found chiefly in the large intestine, especially in the rectum and flexures, but they also occur in the ileum and stomach, and in the liver. They have the power of penetrating the tissues" (Wheeler and Jack's *Practice of Medicine*).

7. In *diabetes mellitus*, sugar is found in the urine; in *chronic parenchymatous nephritis*, the urine will contain granular and hyaline casts and varying amounts of albumin.

8. "Since the days of Celsus, heat, redness, swelling, and pain have been recognized as *cardinal signs of inflammation*, and to these may be added, interference with function in the inflamed part, and general constitutional disturbance. Variations in these signs and symptoms depend upon the acuteness of the condition, the nature of the causative organism and of the tissue attacked, the situation of the part in relation to the surface, and other factors.

"The *heat* of the inflamed part is to be attributed to the increased quantity of blood present in it, and the more superficial the affected area the more readily is the local increase of temperature detected by the hand. *Redness*, similarly, is due to the increased afflux of blood to the inflamed part. The shade of color varies with the stage of the inflammation being lighter and brighter in the early, hyperemic stages, and darker and duskier when the blood flow is slowed or when stasis has occurred and the oxygenation of the blood is defective. In the thrombotic stage the part may assume a purplish hue.

"The *swelling* is partly due to the increased amount of blood in the affected part and to the accumulation of leucocytes and proliferated tissue cells, but chiefly to the exudate in the connective tissue—inflammatory edema. *Pain* is a symptom seldom absent in inflammation. *Tenderness*—that is, pain elicited on pressure—is one of the most valuable diagnostic signs we possess, and is often present before pain is experienced by the patient. That the area of tenderness corresponds to the area of inflammation, is almost an axiom of surgery. Pain and tenderness are due to the irritation of nerve filaments of the part, rendered all the more sensitive by the abnormal conditions of their blood supply. In inflammatory conditions of internal organs, for example, the abdominal viscera, the pain is frequently referred to other parts, usually to an area supplied by branches of the same nerve as that supplying the inflamed part" (Thomson and Miles's *Manual of Surgery*).

The *terminations of inflammation* are: (1) Return of the tissues to health (by resolution, by organization, or by new growth); and (2) death of tissue, or necrosis (by suppuration, by ulceration, or by gangrene).

SURGERY.

1. *Inflammation* is the succession of changes occurring in a living tissue as the result of some kind of injury, provided that this injury be insufficient immediately to destroy its vitality. *Symptoms of inflamma-*

tion are: Redness, swelling, pain, heat, and disordered function.

2. *Septicemia* is a condition due to microorganisms multiplying in the blood, and is characterized by high temperature, but not relieved by getting rid of the original source of infection. *Pyemia* is due to particles of blood clot carrying microorganisms to parts distant from the original source and there setting up metastatic abscesses.

3. *Varieties of talipes: Talipes equinus* consists in extension of the foot, with spasm or shortening of the Achilles tendon, and usually with a loss of power in the anterior tibial group. *Talipes varus* is an inversion of the foot, associated with rotation at the midtarsal joint. *Talipes calcaneus* is characterized by elongation of the tendo Achillis and of the muscles associated therewith, by shortening of the anterior tibial group of muscles, and by slight flexion of the toes. *Talipes valgus* is a deformity of the foot in which eversion is a prominent feature. *Talipes cavus* results from bony subluxation at the midtarsal joint and contraction of the plantar fascia, and produces an exaggeration of the normal transverse arch of the foot.

Talipes equinovarus is a deformity in which the heel is drawn up, and the anterior part of the foot is inverted and drawn inwards.

Treatment: "It may be treated in the early stages by fixing the foot in good position by a series of plaster-of-Paris casings, or by using a malleable metal splint. Tenotomy of tendons which hinder reduction in some cases is necessary, with the subsequent application of plasters. If the ligaments on the inner side of the ankle hinder reduction, they should be divided. In the neglected cases, where the patient has been walking on the outer side of the foot, tarsectomy is necessary. A wedge of bone, with its base outwards, is removed by a chisel or saw, irrespective of the joints, from the tarsus in front of the peroneal groove on the cuboid. The foot can then be brought into good position, and maintained so by plaster-of-Paris" (*Aids to Surgery*).

4. *Treatment of acute appendicitis:* The patient should be kept in bed; no food is to be given for the first twenty-four hours; after this, fluid and jellies may be given; cooling drinks may be allowed in moderation; the pain can be relieved by hot or cold applications on the right iliac region, or morphine may be given if necessary (and only after the diagnosis has been made); an enema of olive oil or glycerine may be given to empty the bowels (if loaded).

The indications for operation vary according to the views of the surgeon. Some maintain that every case of appendicitis should be operated on as soon as the diagnosis is made. Others would operate only in case of rupture, or when suppuration occurs, or in cases which do not improve in a week or so, or in cases which are steadily getting worse. Probably all would agree in taking out every appendix that has undergone more than one mild attack.

5. Stop the bleeding, remove foreign matter, make it as aseptic as possible, coapt the edges, keep the part at rest.

6. In *dislocation of the lower jaw*, the mouth is open and cannot be closed, the jaw protrudes, saliva dribbles from the mouth, speech and swallowing are difficult, and there is a depression in front of the ear. *Treatment:* The surgeon wraps his thumb (for protection), then presses downward and backward on the lower molar teeth; as soon as the condyle is loosened the jaw is closed by pushing up the chin. A Barton bandage is applied and worn for about fourteen days.

7. The *general signs and symptoms of fracture* are: History of injury, disability, pain, swelling, deformity, abnormal mobility, and crepitus.

8. *An oblique inguinal hernia is covered by:* Skin, superficial fascia, aponeurosis of external oblique, intercolumnar fascia, cremasteric fascia, infundibuliform fascia, subperitoneal tissue and peritoneum.

STATE BOARD EXAMINATION QUESTIONS.

NEW HAMPSHIRE STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Classify joints and give illustration of each.
2. Give origin and complete course of the nerve that has most to do with respiration.
3. How is the heart itself nourished?
4. Give the anatomical relation of the small intestine to the other abdominal viscera.
5. Describe the perineum.
6. Place and describe the nasal bones.
7. Describe the internal jugular vein.
8. What do you understand by the mesentery?
9. Place and describe the thyroid gland.
10. Describe the axillary space and give its contents.

PHYSIOLOGY AND HYGIENE.

1. What is the difference between lymph and serum?

2. What causes an extremity to go to sleep?
3. What is the result of injury to or removal of the semicircular canals?
4. What different vascular conditions may lead to a paling of the face?
5. What changes are produced in milk by boiling?
6. What is the function of the pancreas?
7. Describe locomotor ataxia.
8. (*a*) Upon what does the clotting of blood depend? (*b*) What is the cause of this conversion?
9. (*a*) What do you consider the best method of heating a dwelling, and (*b*) give the reasons for your answer?
10. What is the best method of ventilating the plumbing system?

MATERIA MEDICA, THERAPEUTICS, AND THE PRACTICE OF MEDICINE.

1. Describe angioneurotic edema.
2. Name the principal causes of pleuritis.
3. Outline the treatment of pneumonia.
4. Define bronchopneumonia and give its etiology.
5. Give a clinical description of pericarditis with effusion and name some of the diseases with which it is associated.
6. Give the physical signs of exophthalmic goiter and discuss its treatment.
7. Name the principal causes of chronic nephritis.
8. Describe diabetes mellitus, name its complications and discuss its treatment.
9. Describe tetany and give its etiology.
10. Name the exanthematous diseases and give the period of incubation of each.

CHEMISTRY.

1. What is a chemical salt?
2. How is nitroglycerin prepared?
3. From what is phenacetine derived?
4. What are the chemical properties of radium?
5. In what is phosphorus the most readily soluble?
6. Urine sediments are how classified? Give example.
7. What are enzymes? Give some of their chemical characteristics.
8. Name an efflorescent salt, a deliquescent salt, a hydroscopic liquid.
9. Where is sulphur found in the body, and under what form? What is its function?
10. In a systematic examination of stomach contents, what are the physical properties and normal constituents?

NEW HAMPSHIRE.

PATHOLOGY AND DIAGNOSIS.

1. What is the effect on the circulation of increased pericardial pressure?
2. Describe the changes produced in the lungs by mitral stenosis, and how these changes are produced.
3. In what way may arterial disease affect the nutrition of a part?
4. What conditions would influence you in determining the malignity of a tumor?
5. What organ is most commonly affected in visceral syphilis and describe the lesion found in it?
6. Differentiate diagnosis between obstruction in common and cystic biliary ducts.
7. Differentiate between lobar pneumonia and pleurisy with effusion.
8. Symptoms of incipient tuberculosis.
9. Symptoms (*a*) of aortic regurgitation; (*b*) mitral regurgitation; (*c*) mitral stenosis.
10. Differential diagnosis in coma produced by alcohol, opium, uremia, and cerebral hemorrhage.

OBSTETRICS.

1. Name and describe the ligaments of the uterus.
2. How and when will you use ergot in obstetrical practice?
3. Give indications for the use of hot vaginal douche.
4. Differentiate fibroid, pregnancy, ascites.
5. Mention three causes for retention of the placenta. Give treatment.
6. Discuss intrauterine irrigation following complete abortion.
7. What points should govern the duration of the lying-in period?
8. Diagnose the death of the fetus during the early months.
9. Describe the second stage of labor.
10. Under what conditions do we most often find failure of uterine contraction?

SURGERY.

1. Enumerate suture materials in general use, and give special value of each.
2. Give technique of first aid to the injured.
3. How would you treat organic stricture of male urethra?
4. Describe and treat postoperative complications in the abdominal wound.
5. What are the indications for trephining in fracture of the skull?

6. Describe a modified circular amputation of the leg.
7. Give diagnosis and treatment of floating kidney.
8. Describe some one surgical procedure in the treatment of hemorrhoids.
9. Give symptoms of bowel obstruction and outline a surgical operation in the treatment of the same.
10. Describe the usual deformity in fracture of the neck of the femur and outline method of treatment.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

New Hampshire State Board Medical Examiners.

ANATOMY.

1. Varieties of Articulation. 1. *Diarthrodial*, or freely movable; as hip and knee. 2. *Amphiarthrodial*, or slightly movable; as symphysis pubis and joints between bodies of vertebræ. 3. *Synarthrodial*, or immovable; as ethmoid with vomer and parietal with frontal.

2. *Pneumogastric nerve. Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Course:* Outward across the flocculus, to jugular foramen through which it passes, where it is joined by the accessory portion of the spinal accessory nerve. As it goes down the neck, it lies in front of the rectus capitus anticus major and longus colli muscles. It passes in the carotid sheath behind and between the artery and vein. In the thorax the nerve on each side runs a different course. The *right* passes between the subclavian artery and vein, by side of trachea to root of lung, behind esophagus, through esophageal opening in diaphragm to posterior surface of stomach. The *left* passes between the subclavian and carotid arteries, in front of arch of aorta to root of lung, along anterior surface of esophagus, through diaphragm, to anterior surface of stomach. *Distribution* is shown by the names of the branches: Meningeal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary esophageal, and gastric.

3. The heart is nourished by the right and left coronary arteries.

4. Relations of duodenum. *First part: In front*—Liver, gall-bladder. *Behind*—Bile-duct, vena portæ, hepatic artery, gastroduodenal artery. *Below*—Head of pancreas.

Second part: In front—Hepatic flexure of colon. *Behind*—Right kidney, suprarenal capsule, renal vessels,

and inferior vena cava. *Left side*—Head of pancreas, common bile-duct, and pancreatic duct. *Right side*—Hepatic flexure of colon.

Third part: In front—Superior mesenteric vessels and plexus of nerves. *Behind*—Aorta, vena cava, crura of diaphragm, and left psoas. *Above*—Pancreas.

The *jejunum* is in relation with the under surface of the pancreas and the transverse mesocolon.

5. *The perineum* is a diamond-shaped space corresponding to the inferior aperture of the pelvis. It is bounded in front by the symphysis pubis and the subpubic ligament; behind, by the coccyx; and on each side by the rami of the pubis and ischium, the tuberosity of the ischium, and the great sacrosciatic ligament. It is generally divided into two parts by an arbitrary line drawn between the ischial tuberosities, just in front of the anus; the anterior triangle is called the urogenital triangle, and the posterior the rectal triangle. The floor of the perineum consists of: Skin, fascia, triangular ligament, superficial perineal vessels and nerves, accelerator urinæ, transversus perinei, sphincter ani, erector penis, compressor urethræ.

6. The *nasal bones* are situated about the middle and upper part of the face, the two together forming the bridge of the nose. They are small oblong bones and articulate with the frontal, ethmoid, superior maxillary, and with each other. They are generally described as having two surfaces (an outer and an inner), and four borders (superior, inferior, external and internal).

7. The *internal jugular vein* commences at the jugular foramen, and is formed by the junction of the lateral and inferior petrosal sinuses; it passes vertically down the side of the neck on the outer side of the carotid artery, and at the root of the neck it unites with the subclavian vein to form the innominate vein. It collects the blood from the interior of the cranium and from the superficial parts of the face and from the neck. Its tributaries are the facial, lingual, pharyngeal, and superior and middle thyroid veins.

8. The *mesentery* is a broad fold of peritoneum which connects the jejunum and ileum to the posterior abdominal wall.

9. The *thyroid gland* is situated on the sides and in front of the upper part of the trachea, and extends upward on each side of the larynx. The *thyroid gland* consists of two lateral lobes and an isthmus: it is situated at the front and sides of the neck. The lobes extend from about the middle of the thyroid cartilage to the fifth or sixth tracheal ring; the isthmus generally

covers the second and third tracheal rings. The lobes measure about 2x1¼x¾ inches; the gland usually weighs about one ounce. *Blood supply:* Superior and inferior thyroid arteries, with thyreoidea ima; and superior middle, and inferior thyroid veins. *Nerve supply:* Branches from the inferior laryngeal nerve, and from the middle and inferior cervical ganglia of the sympathetic.

10. The axillary space is *bounded: Anteriorly*, by the clavicle, subclavius, pectoralis major, costocoracoid membrane, pectoralis minor; *posteriorly*, by the subscapularis, teres major, and latissimus dorsi; *internally*, by the first four ribs, first three intercostal muscles, serratus magnus; *externally*, by the humerus, coracobrachialis, and biceps.

Contents: The axillary vessels and brachial plexus of nerves, with their branches, some branches of the intercostal nerves, and a large number of lymphatic glands, all connected together by a quantity of fat and loose areolar tissue.

PHYSIOLOGY AND HYGIENE.

1. Blood serum is practically the same as blood plasma, except that serum contains no fibrinogen, but more fibrin ferment. The following figures (from Hammarsten) show the differences between lymph and plasma:

Lymph contains:	Water	939.9
	Solids	60.1
	Fibrin	0.5
	Albumin	42.7
	Fat, cholesterin, lecithin	3.8
	Extractive bodies	5.7
	Salts	7.3
Plasma contains:	Water	908.4
	Solids	91.6
	Total proteids	77.6
	Fibrin	10.1
	Fat	1.2
	Extractive substances	4.0
	Soluble salts	6.4
	Insoluble salts	1.7

2. An extremity may go to sleep from pressure on a nerve; as when the hand goes to sleep after pressure on the ulnar nerve at the elbow, or the foot goes to sleep from pressure on the sciatic nerve when the legs are crossed. A poison circulating in the blood may also irritate the peripheral nerves and cause a similar sensation.

3. "The *semicircular canals* are, through the ves-

tibular nerve and the cerebellum, the most important agents in the preservation of equilibrium. When in a pigeon the horizontal canals are divided, the head moves from left to right and from right to left, with nystagmus and a tendency to revolve on its vertical axis. When the inferior vertical or posterior canals are divided, the head oscillates from front to rear; the animal has a tendency to fall backward. A section of the superior vertical canal causes the head to oscillate from front to rear, with a tendency to fall forward. A section of all the canals is followed by contortions of the most bizarre nature. After a destruction of all the canals the animal cannot maintain his equilibrium. Similar phenomena have been observed in man in disease of the semicircular canals, known as Menière's vertigo. In the fixed position of the head there is equilibrium, but with each movement the varying tension of the liquid in the ampulla changes and irritates the hair-cells."—(Ott's *Physiology.*)

4. Paling of the face may be caused by spasm of the arterioles, increased vasoconstriction, or defective action of the heart.

5. When milk is boiled, a thin scum of albumin appears on the surface, it takes longer to coagulate, and also longer to sour; the taste is changed; the color is also changed, and various bacteria and fungi are destroyed. The digestibility and rate of absorption of boiled milk and raw milk do not differ materially.

6. The *function of the pancreas* is to provide the pancreatic juice, which changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin; converts starches into maltose; emulsifies and saponifies fats; causes milk to curdle. It also supplies an internal secretion.

7. *Locomotor ataxia* is a disease of the spinal cord, characterized by loss of coordination, characteristic and unsteady gait, a tendency to stagger when standing up with the feet together and the eyes closed, sharp and paroxysmal pains called *crises*, girdle sensation, Argyll-Robertson pupils, and loss of knee-jerk and other reflexes. In locomotor ataxia the posterior columns of the spinal cord and the posterior nerve roots are involved. The process is destructive and progressive; it is not a simple wasting, although the nerve fibers are atrophied, but it is characterized by irritation, changes in the axis cylinders, overgrowth of the connective tissue, and sometimes congestion. The spinal ganglia may also be affected, and the membranes over the affected parts are adherent and opaque.

8. In the plasma a proteid substance exists, called fibrinogen. From the colorless corpuscles a nucleoproteid is shed out, called prothrombin. By the action of calcium salts prothrombin is converted into fibrin ferment, or thrombin. Thrombin acts on fibrinogen in such a way that two new substances are formed: one of these is unimportant and remains in solution; the other is important, viz., fibrin, which entangles the corpuscles and so forms the clot.

9. "*Hot-water heating.*—This is regarded as the best form of central heating for small dwellings. Instead of an air jacket over the combustion chamber, there is provided a water receptacle, from which a continuous pipe ascends through the house to its uppermost part, whence it returns by a continuous descending pipe and connects with same water receptacle. The water being heated, circulates freely throughout the system of pipes and the radiators attached thereto, and by heating of pipes and radiators warms the air of the rooms. Between the ascending and descending pipes there is usually placed an expansion tank to allow for the expansion of the water by heat. This system of heating is simple, needs little attention, produces a pleasant and not too high temperature, is not subject to sudden variations, and consumes a relatively small amount of coal.

"*Steam Heating.*—In this system the pipes are filled with steam instead of with hot water, and the water in the boiler is converted into steam. The temperature of the pipes and radiators is higher, their size correspondingly smaller, more fuel is needed to convert the water into steam, a higher pressure gained, more expert attention necessary, a greater degree as well as variation of heat reached. This system is especially suitable to large houses. Steam-heating plants may be located outside of the house and convey the heat by means of underground steam pipes."—(Price's *Essentials of Hygiene*).

10. "The whole plumbing system is ventilated by vertical pipes led through the roof and left open to the outside air, while air from the outside is provided by means of the 'fresh-air inlet,' which, beginning with an air box in the sidewalk, runs into the house drain, inside of the main trap, and by a 4-inch iron pipe. The vent pipes also aid the ventilation within the pipes."—(Price's *Essentials of Hygiene.*)

MATERIA MEDICA, THERAPEUTICS, AND THE PRACTICE OF MEDICINE.

1. "*Angioneurotic edema* is a neurotic condition in

which transient circumscribed, edematous swellings appear on the skin, and sometimes on the mucous membranes, and disappear after a variable period without leaving behind any structural alterations. It arises usually without obvious cause and is in all probability a vasomotor neurosis. Certain drugs in susceptible individuals may induce it. Recurrences are frequent, and when the larynx is involved the affection assumes a grave aspect."—(Hughes' *Practice of Medicine*).

2. The *Principal Causes of Pleuritis* are: Exposure to cold or damp, tuberculosis, pneumonia, pulmonary abscess, bronchitis, nephritis, cancer, various specific fevers, traumatism of the chest; the microorganisms usually found are the pneumococcus, tubercle bacillus, and streptococcus.

3. The *treatment of pneumonia* "consists in fresh air, good nursing, rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60º-70° F.) to the chest or by the use of the warm or cold wet-pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease."—(*Pocket Cyclopedia.*)

4. *Bronchopneumonia* is an acute inflammation of the bronchioles and the alveoli of the lungs. It may be due to a bronchial catarrh, one of the infectious fevers, influenza, heart disease, uremia, nephritis, diabetes; the microorganisms generally present are the *Micrococcus lanceolatus, Streptococcus pyogenes, Staphylococcus aureus* and *albus,* Friedländer's bacillus, and occasionally the colon bacillus, typhoid bacillus, Klebs-Loeffler bacillus, or bacillus of pneumonia.

5. *Pericarditis with effusion.*—"The symptoms are somewhat obscure and may be masked by previously existing disease. Taking a typical case as it occurs in the course of rheumatic fever, we usually find precordial distress; sharp pain is rare, but when present it is most marked at the lower end of the sternum. Moderate fever, or exacerbation of already existing

fever, at the onset; dyspnea, and dusky appearance of the face; rapid action of the heart, sometimes with feeble pulse; symptoms due to pressure by the fluid on the neighboring organs (trachea and esophagus, etc.); great restlessness. The physical signs are: Marked increase of the cardiac dulness; displacement of the apex beat; muffling of the heart sounds; displacement of other organs (if effusion is great). The shape of the dulness is characteristic. It is conical, the apex of the cone being truncated, and situated at the level of the second rib, owing to the close attachment of the pericardium to the great vessels at this point. The apex beat is generally pushed upwards and to the left. It lies, when it is palpable at all, distinctly within the left border of cardiac dulness, not, as in enlargement due to valvular disease, in close relationship to it. The marked distention of the pericardial sac surrounds the heart limits of the organ itself. The amount of bulging and displacement of organs will, of course, vary with the amount of fluid present. As resolution takes place the friction returns, and may be very coarse in character. Muffling of the heart sounds is not always present, and is not entirely due to the presence of fluid. The muffling is therefore due mainly to weakness of the cardiac muscle from accompanying myocarditis, although where the quantity of fluid is very great, in serous and chronic pericarditis, this may in part account for it."—(Wheeler and Jack's *Handbook of Medicine*).

6. The *physical signs of exophthalmic goiter* are: Exophthalmos, goiter, tachycardia, and muscular tremor; anemia, hemic murmurs, cardiac hypertrophy or dilatation, palpitation of the heart; there may be a systolic thrill over the goiter. The *treatment* demands rest, fresh air, and light but nutritious diet; digitalis, bromides, iodides, arsenic, and electricity have all been recommended; partial thyroidectomy, section of the cervical sympathetic, and ligature of the thyroid arteries have been advocated; the newest remedy is probably antithyroidin.

7. The *principal causes of chronic nephritis* are: Arteriosclerosis, alcoholism, gout, lead poisoning, syphilis, acute nephritis, malaria, excess of nitrogeneous diet.

8. *Diabetes mellitus* is a constitutional disease, characterized by polyuria, excess of sugar in the blood and excretion of the same in the urine, and accompanied by severe emaciation. It generally occurs after the fortieth year, but may come on at any age; it is more

common in males, among Hebrews, and in the well-to-do classes. The direct cause is not known. *Complications* are: Pruritus, eczema, boils, cataract, retinitis, neuritis, albuminuria, cirrhosis of kidney, acidosis, and tabes. *Treatment* consists in a quiet, regular mode of living, without worry; gentle exercise; daily bathing in lukewarm water; flannel underwear; the carbohydrates in the food should be cut down until there is no sugar in the urine or a non-carbohydrate diet is reached. Codeine, morphine, antipyrin, arsenic, and strychnine have been recommended.

9. *Tetany* is a condition characterized by tonic muscular spasms of the extremities, which occur at intervals, are painful, and usually bilateral. The *cause* is unknown; toxins acting on the peripheral motor neurons, removal of the thyroid gland, rickets and hysteria are said to be etiological factors.

10. *Exanthematous diseases.*—Cerebrospinal meningitis, incubation period is unknown; erysipelas, a few hours to 3 or 4 days; measles, 10 to 12 days; rotheln, 8 to 16 days; scarlatina, 1 to 21 days; typhoid, 5 to 30 days; typhus, 4 to 12 days; varicella, 4 to 14 days; variola, 7 to 14 days. The figures are approximate.

CHEMISTRY.

1. A *Salt* is a substance derived from an acid by substituting a metal (or its equivalent) for part or all of the replaceable hydrogen of the acid.

2. *Nitroglycerin* is prepared by the action of a mixture of sulphuric and nitric acids upon glycerin.

3. *Phenacetine* is derived from para-phenetidin, which is derived from phenol.

4. *Chemical properties of radium.*—"The emitted rays convert oxygen into ozone and change yellow phosphorus to red. The alpha rays immediately coagulate a sensitive solution of globulin. The beta and gamma rays liberate iodine from iodoform in the presence of oxygen."—(Holland's *Chemistry.*)

5. Phosphorus is soluble in carbon disulphide, and in the fixed and volatile oils.

6. *Sediments in the urine* may be classified according to their presence in *acid* urine, and in *alkaline* urine. In *acid* urine, are found: Uric acid, urates, calcium oxalate, cystin, and calcium phosphate. In *alkaline* urine are found: Phosphates, calcium carbonate, and ammonium urates.

7. *Enzymes* are organized ferments produced by living cells; they cause definite chemical changes in certain substances. They are capable of causing change

in a large amount of material, and they themselves remain unaltered; they only act in a medium of certain reaction, some in an acid medium, some in an alkaline; for each enzyme there is a certain temperature at which its action is the most energetic; the products of their activity must be removed, or the accumulation of these products will hinder further activity.

8. An *efflorescent salt*, sodium carbonate; a *deliquescent salt*, calcium chloride; a *hygroscopic liquid*, alcohol.

9. Sulphur occurs in the body chiefly in the hair, nails and epithelium, but it is a constituent of most proteids. It is found as hydrogen sulphide and as sulphates.

10. *Gastric juice* is a liquid, slightly cloudy, almost colorless, acid, with specific gravity of 1001 to 1010; it deposits a sediment which may contain food particles, gland cells, nuclei, epithelium, and mucus. It consists of water and solids, and free hydrochloric acid; pepsin, chlorides of sodium, potassium, and calcium; phosphates of calcium, magnesium, and iron; mucin, a thiocyanate, and nucleo-proteid.

PATHOLOGY AND DIAGNOSIS.

1. *Increased pericardial pressure* causes embarrassment of the circulation, through pressure on the auricles and great veins. Less blood goes into the right auricle, right ventricle, and pulmonary artery; the blood pressure in the pulmonary artery falls; less blood reaches the left side of the heart and the aorta, and the aortic blood pressure falls. The venous blood pressure rises.

2. In mitral stenosis the lungs may be congested and edematous, and hemorrhage may occur. These conditions may be due to back pressure or to embolic infarction, the emboli coming from the dilated right side of the heart.

3. *Arterial disease*, such as narrowing, pressure by tumors, sclerosis, aneurysms, and blood clots may hinder the flow of blood to a part and so affect its nutrition.

4. *Malignant tumors* interfere with the general health of the patient, produce a cachexia, tend to spread into the neighboring tissues, are apt to recur after removal, and show a tendency to metastasis.

5. The organ most commonly affected in visceral syphilis, is the *liver*.

"Syphilis is met with in the form of diffuse infiltration and cirrhosis, or in the form of gummata. Either

of these varieties may be found as a result of acquired or of hereditary syphilis. In the diffuse form the liver presents much the same appearances as in atrophic cirrhosis, but the connective-tissue bands are much more pronounced and the liver is prone to be irregularly contracted and lobulated. Gummata may occur in any part of the organ, and may be single or multiple, presenting themselves as rounded, yellowish, or grayish masses, ofttimes showing central necrosis and surrounded by connective-tissue hyperplasia. Complete cicatrization may lead to decided scar-formation. In addition to these forms, congenital syphilis may manifest itself in the form of a uniform, diffuse connective-tissue hyperplasia and round-cell infiltration. The liver-cells are pushed apart and are ill-developed or atrophic."—(Stengel's *Pathology*.)

6. If the obstruction is in the cystic duct there is usually no jaundice; if the obstruction is in the common bile duct there is usually intense jaundice.

7.

PLEURISY WITH EFFUSION	LOBAR PNEUMONIA
Onset marked by chilliness persisting for a few days.	Onset acute, with rigor, lasting one hour or longer.
Cough is irritating; no expectoration, or, if present, catarrhal in character.	Cough more marked, and accompanied by rusty or bloody, tenacious expectoration.
Sputum negative; tubercle bacilli rare.	Dense aggregations of pneumococci present.
Moderate fever of continuous type; declines by lysis.	Fever, 102° to 104° F.; falls by crisis.
Prostration moderate.	Prostration extreme.
Unilateral distention of the thorax.	Absent.
Countenance pale and anxious.	Mahogany-colored flush of cheeks.
Limited expansion at base of chest on the affected side.	Degree of expansion slightly, if at all, inhibited.
Tactile fremitus diminished or absent.	Increased over area of consolidation.
Interspaces bulging at base of chest.	Absent.
Percussion shows flatness, with great resistance to the plexímeter finger.	Dullness with less resistance, and sometimes a tympanitic note.

PLEURISY WITH EFFUSION	LOBAR PNEUMONIA
Diminished or absent breath-sounds over effusion the rule. Respiration murmur diffuse, distant, and generally unaccompanied by rales. Bronchial breathing may be present over the entire affected side.	Harsh bronchial breathing and presence of rales in first and third stages, unless a bronchus is plugged.
Friction sound heard in early and late stages.	No friction murmur; rales present.

—(From Anders and Boston's *Medical Diagnosis*).

8. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

9. In *aortic regurgitation*, there is a diastolic murmur, heard loudest at the midsternum opposite the upper border of the third costal cartilage, and transmitted down the sternum; the murmur is soft, blowing, sometimes rough.

In *mitral regurgitation*, there is a systolic murmur. heard loudest over the apex, and transmitted round to the left axilla and under the left scapula; the murmur is soft and blowing.

In *mitral stenosis*, there is a presystolic murmur. heard loudest over the apex, and not transmitted; the murmur is generally low-pitched, and rough.

10. The following table (from Eisendrath's "Surgical Diagnosis") gives the diagnosis: (See table page 463).

OBSTETRICS.

1. The LIGAMENTS OF THE UTERUS are: (1) *Broad ligaments*, which extend outward on each side from the side of the uterus to the side of pelvis. (2) *Rectouterine ligaments*, which extend backward from the intraperitoneal portion of the cervix uteri to the peritoneal investment of the rectum. (3) *Round ligaments*, which extend from the uterus just below the Fallopian tubes, through the inguinal canal to the labia majora. (4) The *ovarian ligaments*, which extend from the superior part of the uterus, behind the Fallopian tubes, to the

10. (Continued from page 462.)

APOPLECTIC COMA	UREMIC COMA	ALCOHOLIC COMA	OPIUM POISONING
Deep coma; sudden onset. If any injury, only a scalp wound.	Deep coma. Slow onset unless convulsions have preceded the coma.	Can be aroused by supra-orbital pressure unless very profound.	Can be aroused unless very deep.
Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Albuminuric retinitis.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse rapid.	Pulse more rapid than normal and full.	Pulse rapid, may be irregular.
Respiration slow and irregular.	Respiration frequent and irregular.	Regular respiration.	Respiration very slow—may be 6 to 8 per minute.
Temperature higher on paralyzed side, but lower in rectum.		May be low or normal.	
Urine contains trace of albumin, but may be same as in uremia.	Urine shows albumin, casts, and low urea percentage.		
Hemiplegia with convulsions on one side.			

inner end of the ovary. (5) The *uterosacral ligaments*, which extend from the highest part of the cervix uteri to the sides of the sacrum opposite the lower border of the sacroiliac synchondrosis.

2. "The use of ergot favors uterine contraction and retraction. Ergot may be given hourly as a routine, in half dram doses of the fluid extract, until three doses have been taken, or used only when there are signs of relaxation, as a prophylactic against postpartum hemorrhage. Postpartum inertia is not uncommor when the patient has been the subject of hydramnios, twins, etc., or has been subjected to a long general anesthesia, or is exhausted, with a rapid pulse and low blood pressure. Ergot is best used hypodermatically in the form of ergone (25 min.), or ergotole (25 min.), combined with pituitrin (1 ampoule). The generous use of ergot in the puerperium is of value also as a prophylactic against puerperal infection, since it tends to prevent the formation and the prolonged retention of blood clots within the uterus, and by its action on the muscular fibers tends to close the lymphatics and blood vessels against absorption. Moreover, by thus limiting the blood supply it promotes involution."—(Polak's *Obstetrics*).

3. INDICATIONS FOR HOT VAGINAL DOUCHE.—*Before labor:* 1. To induce premature labor. 2. As a prophylactic in cases of suspicious or undoubtedly infective vaginal discharge. *During labor:* As preliminary to version, forceps, or embryotomy. *After labor:* 1. Many obstetricians give a routine douche for the sake of cleanliness. 2. In case of foul lochia. 3. After repair of perineal lacerations. 4. As an element of treatment of puerperal sepsis.—(From Scott's *State Board Obstetrics*).

4. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ascites: Absence of the signs of pregnancy; the abdo-

men is distended, but the shape varies with the position of the patient; on lying down there is bulging at the sides, the tumor fluctuates, and percussion shows dullness in the flanks, with resonance in the median line, but the dullness varies according to the position of the patient.

5. RETAINED PLACENTA—*Three causes:* Inertia uteri, endometritis, or morbid adhesion of the placenta to the wall of the uterus. *Treatment:* "A finger—one or two —must be insinuated between the uterus and placenta at some point already partially separated, or, if no partial separation exists, at a point where the placental border is thick, and then passed to and fro, transversely, through the uteroplacental junction, acting like a sort of blunt paper knife, until separation be complete. Another mode is to find or make a margin of separation as before, and then peel up the placenta with the finger-ends, rolling the separated portion toward the palm of the hand upon the surface of the still adherent part. Great care is necessary to avoid peeling up an oblique layer of uterine muscular fiber, which might split deeper and deeper until leading the finger-ends through the uterine wall into the peritoneal cavity. Should such a splitting begin, leave it alone and recommence the separation at some other point on the placental margin. It is sometimes only possible to get the placenta away in pieces. These should be afterward put together and examined to indicate what remnants are left behind. It may be quite impracticable to get out every bit, but small remnants or thin layers too firmly adherent for removal do not distend the womb enough to create hemorrhage from their bulk, and the subsequent danger of septicemia from their decomposition may be obviated by injecting warm (2 per cent.) creolin water into the uterus twice daily, until everything has come away."—(King's *Obstetrics.*)

6. If the abortion is complete, and there is no septic or other pathological condition present there is no need for an intrauterine douche.

7. Points which should govern the duration of the lying-in period, are the character and duration of the labor, the presence or absence of complications, the condition of the uterus, and the strength of the woman.

8. Diagnosis of the death of the fetus during the early months is difficult. The chief signs are that the uterus ceases to grow, the abdomen does not enlarge, the breasts either cease enlarging or become smaller again, the temperature of the cervix ceases to be higher than that of the vagina. The mother ex-

periences vague symptoms of malaise, languor, heaviness, depression, chilly sensations and anorexia.

9. *During the second stage of labor*, examinations should be made only when necessary. In multiparæ the membranes may be ruptured with the finger or with some aseptic instrument. Care should be taken not to injure the child's scalp or the lower uterine segment. The pain may require the administration of chloroform or ether, but not to the extent of complete anesthesia. The expulsive force of the abdominal walls may be increased by directing the patient to pull upon a sheet firmly secured to the foot of the bed. Attempts may be made to prevent laceration of the perineum by making firm backward and upward pressure against the occiput during the pains; by restraining voluntary expulsive efforts during the pains; and by securing expulsion of the head between the pains. The head should be supported when born; the eyes should be cleansed with sterile water; and if the cord is coiled about the neck, it should be loosened or slipped over the head. Delay in delivery of the shoulders may be overcome by stimulating the uterus by friction through the abdominal wall or traction. The cord is ligated and cut when pulsation has ceased, and the child is placed by the mother's side with its face turned away from the maternal discharges.—(*Pocket Cyclopedia.*)

10. *Failure of uterine contraction* may be caused by: "Overdistention of the uterus from plural pregnancy or polyhydramnios; distention of the bladder or rectum; obliquities and displacements of the uterus; thinning of the uterine walls resulting from frequent and quickly repeated labors, or from degeneration of the uterine tissues; precocious or advanced age; general debility or feebleness of the woman from previous diseases, enervating habits, heat of climate, or of season, or the air of a superheated room; exhaustion of the woman from hemorrhage or from lack of sleep or food. Uterine action is sometimes inefficient from uremia, and when there is morbid adhesion between the fetal membranes and uterine wall. Mental emotions: fear, grief, surprise, anxiety, disappointment, and the presence of offensive persons or things will produce it. These last named causes may depend upon idiosyncrasy or unaccountable personal antipathies."—(King's *Manual of Obstetrics.*)

SURGERY.

1. *Suture materials:* (1) Silkworm gut, used only on surfaces, from which it may subsequently be removed. (2) Silk, used in abdominal surgery, for sutur-

ing intestines and tying pedicles. (3) Catgut, used for buried sutures. (4) Kangaroo tendon, used for bone, and as an absorbable suture which will last a long time. (5) Silver wire, used for bone.

2. The nature of first aid to the injured will depend upon the injury. If a layman is rendering first aid, his first duty is to keep the crowd away, allow the injured one to get fresh air, see that the injury is not made worse, combat shock, check hemorrhage, place the patient in the most comfortable and safe position, and keep him warm and sheltered.

3. *Organic stricture of the male urethra may be treated* by: Gradual dilatation, continuous dilatation, excision of the stricture, external or internal urethrotomy, urethrectomy, or the operation of Wheelhouse or Cock.

4. *Post-operative complications in an abdominal wound,* are: (1) *Stitch-hole abscess;* the infected sutures should be removed, and their tracts syringed with hydrogen peroxide; this should be done daily; a thick gauze compress soaked with a 1:1000 solution of mercury bichloride is then applied, and covered with the usual dressings. (2) *Suppuration in the wound;* open the abscess, with all blind pouches or cul-de-sacs, irrigate the wound with hydrogen peroxide, and dress as in case of stitch-hole abscess. (3) *Ventral hernia;* this requires either a support or binder, which is merely palliative; or another operation.

5. *Trephining, in cases of fracture of the skull,* is indicated in: Simple fractures with pronounced depression; compound fractures with much depression; punctured fractures; any fracture where there are distinct cerebral symptoms.

6. *"Modified circular amputation of the leg.*—Cut semilunar skin-flaps, lay them back, and cut circularly to the bone at the edge of the turned-up flap. Another method of modified circular amputation is by adding to the circular cut a vertical incision down the front of the leg. In sawing the bones of the leg the surgeon, who stands to the outer side of the right leg or to the inner side of the left leg, divides the fibula first, and at a higher level than the tibia, and bevels the anterior surface of the tibia. In sawing the left fibula the saw points to the floor; in sawing the right fibula it points to the ceiling."—(Da Costa's *Modern Surgery.*)

7. In *floating kidney* the *symptoms* may be entirely absent in some cases. They consist of aching pain in the loin, nausea, vomiting, and constipation. Attacks of renal colic and intermittent hydronephrosis may oc-

cur from kinking of the ureter. A movable tumor can be felt in the region of the kidney.

Treatment consists in improving the general health and wearing an abdominal belt with a pad. When this fails, or there are attacks of colic or hydronephrosis, nephrorrhaphy should be done.

8. "The application of the ligature is an easy and useful method. It is not so rapid as the cautery, is followed by more pain, healing requires a longer time, and stricture is more common. In this operation, after anesthetizing, stretch the sphincter and treat each hemorrhoid separately. Catch a pile with a pair of forceps or a volsellum, pull it down, and cut a gutter through the skin-margin if the pile is of the mixed variety; tie the small piles without transfixing, but transfix the large piles; tie with silk (coarse silk for the large piles, finer silk for the small piles); cut off each tumor beyond the thread, and cut the ligatures short. Treat the other piles in the same manner. Irrigate with hot normal salt solution. Do not insert packing. Apply a gauze pad and a T-bandage. Give some morphine to lock up the bowels, and keep the patient on a light diet for three days, at the end of which time a saline may be given. Just before the bowels act remove the dressings and give an enema of warm water or of glycerin. After the movement wash out the rectum first with dilute peroxide of hydrogen and next with hot salt solution, dust with iodoform, and apply a gauze pad over the anus. Irrigate daily until healing is complete. After the tenth day examine with a speculum to see that the ligatures have come away; if any are found in place, remove them."—(Da Costa's *Modern Surgery.*)

9. *Symptoms of acute intestinal obstruction:* "Sudden severe pain referred to the umbilicus comes on, perhaps, after an effort. Shock, evidenced by a weak pulse, a cold, clammy skin, and a subnormal temperature, accompanies the pain. The pain, intermittent at first, becomes continuous. Vomiting is persistent, and soon becomes fecal smelling. The patient becomes exhausted by the vomiting and inability to take food. The abdomen becomes distended, and if the obstruction is not relieved, perforative peritonitis follows, so that the patient dies in about seven to ten days from the onset. Constipation is usually absolute, though the lower bowel may empty itself at first."

Treatment:—"The only thing that can give the patient the chance he ought to have is immediate operation. It is advisable to wash out the stomach before the

operation, so that intestinal contents may not be vomited and inhaled during the operation. Three objects are aimed at: (1) To empty the distended bowel above the obstruction; (2) to relieve the obstruction; (3) to treat the strangulated intestine. In cases that are almost moribund, the abdomen should be opened with cocaine or eucaine anesthesia; a distended coil is pulled out and tapped, a Paul's tube being subsequently tied in. The peritoneal cavity is protected with gauze packing during these manipulations. The bowel is stitched to the abdominal wound after the feces and flatus have drained away. No attempt at relief of the obstruction can be made in these cases till a later date, and, of course, under the circumstances a high death-rate must be expected.

In less severe cases the abdomen should be opened in the midline below the umbilicus, and a systematic search made for the cause of the obstruction. The hernial orifices are first examined, then the cecum. If the cecum is distended, the obstruction lies below it; if collapsed, above it. In the former case the sigmoid should next be examined. If collapsed, the colon must then be traced backwards till the obstruction is found. If the cecum is collapsed, the intestine must be pulled out a foot at a time and examined, beginning with the ileum, and replacing it as each part is done with. If the intestine is much distended, several coils may be tapped and emptied, to facilitate the search."—(*Aids to Surgery.*)

10. If the fracture of the neck of the femur is *intracapsular*, there is very apt to be fibrous union with false joint; if the fracture is *extracapsular*, shortening is very common.

Treatment of intracapsular fracture: "Fibrous union nearly always occurs in old people, as the blood supply of the upper fragment depends solely on the obturator branch running in the ligamentum teres. Then, old people often die of hypostatic pneumonia if kept lying long upon the back. If the patient be young, he should be put upon a long Liston splint, with extension, for six weeks. The same should be tried with old people, but the moment the respirations begin to increase the patient must be got up, wearing a Thomas' hip splint. Impaction favors bony union, and so should not be broken down."

Treatment of extracapsular fracture: "Unless there is great deformity, it is not advisable to break up impaction. Bony union always occurs. The patient should be anesthetized, and traction kept upon the leg

during fixation. A stirrup extension is first put on, and then the leg is firmly bandaged to a long Liston splint, with the eversion corrected. The chest is fixed to the splint by a binder; the foot of the bed is raised, and a weight of eight or ten pounds is put on to the cord of the stirrup extension. Hodgen's splint may also be used. Union occurs in six weeks."—(*Aids to Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF NEW JERSEY.

ANATOMY.

1. Describe the structure of the arteries and give their nerve and blood supply.
2. What arteries, muscles, and nerves would be severed in a cross-section at the middle of the humerus?
3. What are the lymphatic glands?
4. Give the situation of the lymphatic glands of the chest.
5. Locate and describe Peyer's glands.
6. Give the deep and superficial origin, course, and distribution of the pneumogastric nerve.
7. Bound Scarpa's triangle and mention the vessels and nerve in it.
8. What bones enter into the formation of the nasal fossæ?
9. Name the bones that form the ankle-joint and give their relations.
10. Name the abdominal viscera wholly covered with peritoneum; those partially covered.

PHYSIOLOGY.

1. Define physiology.
2. Trace the circulation of the blood beginning at the left ventricle.
3. How does the fetal circulation differ from that of the adult?
4. Give the physical and chemical composition of blood.
5. What are the functions of blood?
6. What is the portal system? Name the enzymes manufactured from its blood.
7. Name the organs of excretion in order of importance.

8. What is the function of the red blood cells? Of the leucocytes?
9. What is glycogen? What is its use?
10. What changes occur in a muscle in exercise?

CHEMISTRY.

1. What is chemistry?
2. What are the three laws of chemical combination?
3. Name three strong mineral acids and which is the strongest?
4. What are alkaloids, and how are they divided?
5. What is the chemical composition of the blood?
6. Give the antidote for poisoning by carbolic acid.
7. What are physical and what are chemical changes?
8. Define organic and inorganic chemistry.
9. Define specific gravity. What relation does the amount of solid matter in urine bear to the specific gravity of the urine?
10. What is the formula of hydrogen dioxide and by what other name is it known?

MATERIA MEDICA AND THERAPEUTICS.

1. Name three drugs that will liquefy and increase bronchial secretion. Give official name, dose of each. Write a prescription containing one.
2. Define a diuretic; name three vegetable diuretics. Give dose and official name of each. Write a prescription containing one.
3. Name two drugs that will lower blood pressure. Give official name and dose of each.
4. Name two official drugs that will change the color of the urine; also name two that will change the color of the feces.
5. What is epinephrin? Give official name, dose, properties, and uses.
6. Name three drugs that may cause irritation or skin eruption. Give official name, dose, and properties of each.
7. Oil of santal; give dose, properties, and uses; official name.
8. Elaterin; give official name, dose, properties, and uses.
9. What drugs would you use in the early stages of a case of pneumonia? Give official name; dose of each. Write a prescription containing one.
10. Name five official tinctures and give dosage of each.

HISTOLOGY.

1. Describe the suprarenal capsule, macroscopically and microscopically.

2. What do you mean by the reconstruction of anatomical structure? Give technique.
3. Describe epithelial tissue; give varieties and where found.
4. Describe motor nerve endings in voluntary muscle tissue.

PATHOLOGY.

1. What is the difference between hypertrophy and enlargement?
2. Give theory of diabetes mellitus.
3. Describe gout; give theory.

BACTERIOLOGY.

1. Name the pathogenic spirilla and diseases caused by them.
2. Describe mycetoma.
3. Name the pathogenic protozoa and give life history of the dysentery ameba.

HYGIENE.

1. What is a water shed?
2. How can it be properly safeguarded, and why?
3. Name the water-borne diseases.
4. What is the best general method of purifying drinking water?
5. How may ground water injuriously affect the public health?

MEDICAL JURISPRUDENCE.

1. What is the difference between molecular and somatic death?
2. What are the signs of, and how can you determine between, real and apparent death?
3. How would you conduct an autopsy?
4. Name most of the causes of violent death, and tell how you would differentiate them.
5. What is the object of a coroner's inquest?

PRACTICE OF MEDICINE.

1. Differentiate rachitis and scurvy.
2. Describe the several kinds of arterial pulse.
3. Differentiate catalepsy, epilepsy, and hysteria.
4. What diseases may cause occlusion of the common bile-duct?
5. Describe the varieties of stomatitis, giving the causes of each.
6. Describe vocal fremitus and name the conditions causing its increase or decrease.
7. Describe the urinary casts; where formed and the disease each indicates.

8. Describe the eruption *only*, in its different stages, of measles, scarlet fever, and smallpox.
9. Describe the pathological pulmonary sounds heard on auscultation of the lungs and name the conditions causing them.
10. Describe the normal heart sounds and state the points on the chest where each is heard with the greatest distinctness.

OBSTETRICS.

1. Give average normal pelvic measurements which you would take at examination of a woman in her first pregnancy. Give smallest measurements which would permit natural delivery.
2. Give mechanism of second stage of labor in L. O. A.
3. Give treatment of different degrees of uterine inertia.
4. Give three causes for postpartum hemorrhage, and treatment for each.
5. Give management of shoulder presentation.
6. Give causes for non-engagement of head at brim, and give management of each condition.

GYNECOLOGY.

1. Name two conditions in which cystoscopy would aid in diagnosis, and give cystoscopic findings in each.
2. Differentiate subinvolution of uterus, chronic metritis, and uterine fibroid.
3. Give history and symptoms of tubal pregnancy in third month, and its possible terminations.
4. Give blood supply of the uterus and ovaries.

SURGERY.

1. Define a compound, comminuted, and complicated fracture. Give treatment.
2. Give diagnostic symptoms and treatment of acute epididymitis.
3. Give diagnostic symptoms of stone in ureter.
4. Describe the deformity and the method of reduction of the same in Pott's fracture.
5. Describe congenital dislocation of the hip.
6. What conditions may give rise to symptoms simulating those of appendicitis?
7. What is the clinical aspect of a beginning carcinoma of the female breast?
8. Define hernia; give different varieties of abdominal hernia.
9. What are the symptoms produced by gallstones?
10. Define and give symptoms of hypothyroidism.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF NEW JERSEY.

ANATOMY.

1. An *artery* consists of three coats: The tunica interna, or internal coat; the tunica media, or middle coat, and the tunica adventitia, or external coat. The internal coat consists of a basement membrane, on which is a layer of endothelial cells. The middle coat consists of involuntary muscle fibers, between the layers of which are some elastic fibers. The external coat consists of connective tissue (white fibrous and yellow elastic). Between the two outer coats is an elastic membrane.

The *nerve supply* is by the vasomotor nerves. The *blood supply* is by the vasa vasorum.

2. Brachial, superior profunda and inferior profunda *arteries;* biceps, triceps, and brachialis anticus *muscles*; median, ulnar, internal cutaneous, musculospiral, and musculocutaneous *nerves.*

3. *Lymphatic glands* are solid bodies, of variable size, situated in the course of the lymphatic and lacteal vessels; they are surrounded by a capsule, and are filters through which lymph and chyle flow.

4. *Lymphatics of the thorax.* The *intercostal* lymphatic vessels, derived from the side of the abdomen and thorax, pleuræ, diaphragm, spinal canal, muscles of the back, etc., follow the course of the veins, traverse fifteen to twenty intercostal glands near the heads of the ribs, and terminate in the thoracic duct. The *posterior mediastinal glands* are between the intercostal glands, and communicate with them. They receive vessels from the pericardium, esophagus, and diaphragm. Some of the efferent vessels end in the bronchial glands, others in the thoracic duct. The *anterior mediastinal lymphatic vessels* are derived from the anterior wall of the abdomen and thorax, the diaphragm, pericardium, upper surface of the liver, heart, and thymus gland. They traverse about eighteen to twenty *anterior mediastinal glands*, situated in the course of the internal mammary vein, pericardium, and great vessels of the heart, and terminate in thoracic and right lymphatic ducts. The pulmonary lymphatic vessels consist of a superficial and deep set, traversing in the last part of their course the pulmonary glands. The *bronchial glands* are twenty or more glands at the bifurcation of the trachea and root of the lungs, and receive the lymphatic vessels of the

lungs and bronchi. They become pigmented, and are often the seat of disease. Their efferent vessels terminate on the right side in the right lymphatic duct, either directly or by forming the broncho-mediastinal trunk, and on the left side in the thoracic duct. —(Young's *Anatomy.*)

5. *Peyer's glands* are large, oval groups of lymph follicles; practically they are groups of solitary follicles; they are from half an inch to four inches in length, and are situated throughout the small intestine but are largest and most numerous in the ileum.

6. *Pneumogastric nerve. Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Course:* Outward across the flocculus, to jugular foramen through which it passes, here it is joined by the accessory portion of the spinal accessory nerve. As it goes down the neck it lies in front of the *rectus capitis anticus* major and longus colli muscles. It passes in the carotid sheath behind and between the artery and vein. In the thorax the nerve on each side runs a different course. The *right* passes between the subclavian artery and vein, by side of trachea to root of lung, behind esophagus, through esophageal opening in diaphragm to posterior surface of stomach. The *left* passes between the subclavian and carotid arteries, in front of arch of aorta to root of lung, along anterior surface of esophagus, through diaphragm, to anterior surface of stomach. *Distribution* is shown by the various names of the branches of the nerve: Meningeal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary esophageal, and gastric.

7. Scarpa's triangle is a triangular area or depression situated just below the fold of the groin. It is bounded *above* by Poupart's ligament, *externally* by the Sartorius, and *internally* by the inner margin of the Adductor longus; its *apex* is formed by the junction of the Adductor longus and Sartorious. The *floor* is formed, from without inward, by the Iliacus, Psoas, Pectineus, Adductor brevis, and Adductor longus. *Contents:* The femoral vessels pass from about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it is the

crural branch of the genitocrural nerve. At the apex, the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics.

8. *Bones entering into formation of nasal fossæ:* Nasal, frontal, ethmoid, sphenoid, vomer, palate, superior maxillary, lacrimal, and inferior turbinated.

9. *Bones entering into the formation of the ankle joint,* are: The lower end of the tibia above the internal malleolus (of tibia) internally, the external malleolus (of fibula) externally, and the upper surface of the astragalus below.

10. *Viscera covered by peritoneum:* Liver, stomach, spleen, first part of duodenum, jejunum, ileum, cecum, transverse colon, sigmoid flexure, upper half of rectum, ovaries.

Viscera partially covered by peritoneum: Second and third parts of duodenum, ascending and descending colon, bladder, middle part of rectum.

PHYSIOLOGY.

1. *Physiology* is that branch of science which treats of the functions of the body in a state of health.

2. "The left ventricle pumps the arterial blood through the large arteries, the small arteries, and the arterioles into the systemic capillaries. For the most part between the capillaries and the tissues is the tissue fluid, and across this the tissues acquire the oxygen from the arterial blood, and return carbon dioxide to the blood in the capillaries. The blood which leaves the tissues is venous. The venous blood returns from the capillaries through the small veins into the larger veins, and the largest veins pour the blood back into the right auricle. It will thus be seen that the right side of the heart is occupied with the pulmonary circulation, and the left side of the heart with the systemic circulation. The right auricle receives the venous blood as it returns from the tissues, and transmits it to the right ventricle. The function of the right ventricle is to pump the venous blood through the pulmonary arteries into the lung capillaries, where the venous blood becomes oxygenated. The oxygenated blood returns by the pulmonary veins to the left auricle, and the arterial blood is then received into the left ventricle."—(Lyle's *Physiology.*)

3. *Differences between the fetal circulation and that of the adult:* In the *fetus* there is direct communication from the right auricle to the left auricle by the foramen ovule; the Eustachian valves are larger, the heart is relatively larger; there is communication be-

tween the pulmonary artery and the descending aorta by means of the ductus arteriosus; there is communication between the internal iliac arteries and the placenta by means of the umbilical or hypogastric arteries; and the presence of the ductus venosus which unites the umbilical vein and the inferior vena cava.

4. *Physical composition of the blood:*

1. Plasma.
2. Corpuscles { Colored / Colorless / Platelets.

Chemical composition of the blood: Plasma consists of water and solids (proteids, extractives, fats, and salts of sodium, potassium, and calcium). *Corpuscles* consist of water and solids (hemoglobin, globulin, lecithin, cholesterin, iron, and salts of sodium, potassium, magnesium, and calcium.

5. FUNCTIONS OF THE BLOOD: The *red blood cells* carry oxygen from the lungs to the tissues. The *white blood cells:* (1) Serve as a protection to the body from the incursions of pathogenic microorganisms; (2) take some part in the process of the coagulation of the blood; (3) aid in the absorption of fats and peptones from the intestine, and (4) help to maintain the proper proteid content of the plood plasma. The function of the *platelets* is not determined; it is possible that they take some part in the coagulation of the blood. The *plasma* conveys nutriment to the tissues; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

6. The portal system is composed of four veins (superior mesenteric, inferior mesenteric, splenic, and gastric), which collect the venous blood from the stomach, intestine, pancreas, and spleen, and conduct it to the liver.

The enzymes manufactured from its blood: "No fewer than eleven ferments have been stated to be present and active in the liver alone—viz., a proteolytic and a nuclein-splitting ferment, a ferment which splits off ammonia from amino-acids, a milk-curdling ferment, a fibrin ferment, a bactericidal ferment, an oxydase, a lipase, a maltase, a ferment called glycogenase, which changes glycogen into dextrose, and an autolytic ferment."—(Stewart's *Physiology.*)

7. *The chief organs of excretion* are: The kidneys, skin, lungs, alimentary canal, and liver.

8. See QUESTION 5.

9. *Glycogen*, or animal starch, is a polysaccharide, found in the liver, muscles, placenta, leucocytes, cartilage, and other tissues. Glycogen is a source of energy and heat for the body, is a convenient method for the storage of sugar in the body, and is a possible source of fats and proteins.

10. *When a muscle is in a state of activity:* (1) It becomes shorter and thicker, but (2) there is no change in volume; (3) there is an increased consumption of oxygen; (4) more carbon dioxide is set free; (5) sarcolactic acid is produced; and hence (6) the muscle becomes acid in reaction; (7) it becomes more extensible, and (8) less elastic; (9) there is an increase in heat production and consequently a rise of temperature; (10) the electrical reaction becomes relatively negative; and (11) a sound is produced.

CHEMISTRY.

1. *Chemistry* is that branch of science which treats of the composition of substances, their changes in composition, and the laws governing such changes.

2. (1) *Law of definite proportions:* A compound always consists of the same elements, and in the same proportions.

(2) *Law of multiple proportions:* When two elements unite with each other to form more than one compound, the resulting compounds contain simple multiple proportions of one element and a fixed quantity of the other element.

(3) *Law of reciprocal proportions:* The ponderable quantities in which substances unite with the same substance express the relation, or a simple multiple thereof, in which they unite with each other.

3. *Three strong mineral acids:* Sulphuric acid, hydrochloric acid, nitric acid; of these, sulphuric acid is the strongest.

4. *Alkaloids* are organic, nitrogenized, basic substances, alkaline in reaction, and capable of combining with acids to form salts in the same way that ammonia does.

They are divided into volatile and fixed alkaloids.

5. See above, PHYSIOLOGY, Question 4.

6. *Antidote for poisoning by carbolic acid* is sodium sulphate, also alcohol.

7. A physical change does not alter the *composition* of the substance; a chemical change does alter its *composition.*

8. *Organic chemistry* is the chemistry of the carbon *compounds.*

Inorganic chemistry is the chemistry of substances which do not contain carbon.

9. *Specific gravity* is the weight of a given volume of a substance as compared with the weight of the same volume of some other substance taken as a standard, under like conditions of temperature and pressure.

The amount of solid matter in the urine may be estimated by multiplying the last two figures of the specific gravity of the urine by 2.33 (Haeser's coefficient); the product gives the amount of solid matter in one liter of urine.

10. The formula of hydrogen dioxide is H_2O_2; it is also known as hydrogen peroxide, and as oxygenated water.

MATERIA MEDICA AND THERAPEUTICS.

1. *Three drugs that will liquefy and increase bronchial secretion:* Ammonii chloridum, gr. vijss; ammonii carbonas, gr. vijss; fluidextractum senegæ, ♏xv.

℞.

Ammonii carbonatis, gr. xxxij.
Fluidextracti senegæ.
Fluidextracti scillæ, aa ʒj.
Tincturæ opii camphoratæ, ʒvj.
Aquæ, ʒiv.
Syrupi Tolutani q. s. ad ʒiv. Misce.

Signa: One teaspoonful every three hours.

2. *A diuretic* is an agent which promotes the secretion of urine.

Three vegetable diuretics: Tinctura digitalis, ♏xv; tinctura strophanthi, mviij; fluidextractum cimicifugæ, ♏xv.

℞.

Tincturæ digitalis, ʒj.
Spiritus ætheris nitrosi, ʒiij.
Liquoris ammonii acetatis, ʒss.
Aquæ, q. s. ad ʒvj. Misce.

Signa: One ounce every three hours.

3. *Two drugs that will lower blood pressure:* Amylis nitris, ♏iij; spiritus glycerylis nitratis, ♏j.

4. *Two official drugs that will change the color of the urine:* Phenol and santoninum.

Two that will change the color of the feces: Ferrum and bismuthi subnitras.

5. *Epinephrin* is a substance obtained from the medullary portion of the suprarenal glands of the sheep (or other animal). It is *official* under the name of Glandulæ suprarenales siccæ; dose 4 grains; *properties:* "it is a strong cardiac stimulant, slowing the pulse-rate and affecting the heart muscle in the same

way as digitalis; it is a powerful vasoconstrictor and raises blood-pressure more than any other known substance; it increases the tone of all muscular tissue; it causes diminution of peristalsis and a depression of the respiratory center, which may result in respiratory failure and death. *Uses:* In minor surgery as a local vasoconstrictor; hay fever (both internally and locally); bronchitis; bronchial asthma; congestion and edema of the lungs; cardiac diseases (here it should be employed with caution); Addison's disease; shock." —(Wilcox's *Materia Medica.*)

6. *Three drugs that may cause irritation or skin eruption:* Belladonnæ folia, gr. j; belladonnæ radix, gr. ¾; *properties:* Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic doses cause the blood pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

Copaiba, ℥xv; *properties:* "In small doses it is stomachic, in large ones a gastrointestinal irritant; in the process of excretion it stimulates and disinfects mucous membranes, especially those of the genitourinary tract, and on the skin it may give rise to eruptions and annoying itching. It is also diuretic, and in large amounts irritates the kidneys."—(Wilcox's *Materia Medica.*)

Cubeba, gr. xv; *properties:* "Rubefacient; irritant to the stomach; diuretic; like other volatile oils, it causes some cardiac stimulation and also stimulates the functions of the organs by which it is excreted; sometimes produces a papular or erythematous rash. Its chief action is on the mucous membrane of the genitourinary tract, which is both stimulated and disinfected by it. Its resinous acid is believed to aid the effects of the oil in its action upon the renal epithelium, as well as the bronchial mucous membrane."—(Wilcox's *Materia Medica.*)

7. *Oil of santal: dose,* 8 minims; *properties:* "Closely resembles that of copaiba and cubebs, but oil of santal is less irritant and more palatable. *Uses:* gonorrhea, gleet, cystitis, urethral hemorrhage, bronchitis."—(Wilcox's *Materia Medica.*) *Official name* is oleum santali.

8. *Elaterin: Official name,* elaterinum; dose, 1/10 grain; *properties:* "Closely resembling that of colocynth, but much more energetic, elaterin being regarded as the most powerful hydragogue cathartic known. In prop-

erly regulated doses, however, it causes comparatively little pain or irritation, notwithstanding the free catharsis produced. *Uses:* It is the most efficient of the hydragogue cathartics in general dropsy and in ascites; also used with advantage in uremia."—(Wilcox's *Materia Medica.*)

9. In *lobar pneumonia* routine treatment is to be condemned. In the first stage the following drugs may be required, under certain conditions: Alcohol, ammonii carbonas, 4 grains; quininæ hydrochloridum, gr. iv; tinctura veratri, 15 minims; digitalis, 1 grain; strychnine sulphas, 1/60 grain.

℞.

Tincturæ veratri, ♏. xl.
Spiritus ætheris nitrosi, ℥vj.
Liquoris potassii citratis, ℥ivss.
Syrupi zingiberis qs. ad ℥vj. Misce.

Signa: One tablespoonful q. 3. h.

10. *Five official tinctures:* Tinctura aconiti, 10 minims; tincture aloes, 30 minims; tinctura capsici, 8 minims; tinctura, digitalis, 15 minims; tinctura opii, 8 minims.

HISTOLOGY.

1. The *suprarenal capsules* "are two triangular flattened organs covered with fat that lie one on either side of the spine, in close proximity to the upper kidney border. Each suprarenal is invested in a fibrous capsule and a liberal supply of fat. The capsule contains many elastic fibers and some smooth muscle cells. The cortex shows a radial structure and has been divided into three zones, which are not very well defined. (1) The *zona glomerulosa,* next to the capsule, consists of a row of columnar epithelial cells folded in such a way as to form oval bodies or elongated heads separated by strands of connective tissue from the capsule. The oval nuclei are in the middle of the cells. (2) The *zona fasciculata* makes up the larger portion of the cortex and consists of anastomosing columns of epithelial cells, a continuation of the zona glomerulosa. Each column has two rows of polygonal cells that are smaller than those of the glomeruli. (3) The *zona reticularis* borders on the medulla. Here the columns anastomose and freely interlace. The cells resemble those of the fasciculata. Connective tissue cells ramify between the columns, hence the radial appearance of the cortex. The *medulla* is coarsely vascular. The cells are smaller than those of the cortex and are grouped in round or oval masses. These cells are finely

of sections. Serial sections
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camera lucida must be used
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of different states without gout being present. tes are inert bodies, and the most that can be that they are an indicator; that is, the faulty ism which produces them produces also sub- that are toxic. These substances we do not ith any exactness. . . . It is necessary to ore fully than we do, the toxic effects of the ases, for they are toxic, and it is perhaps the ses that are responsible for gout. Gout, there- probably the outcome of insufficient oxidation, the precursors of the uric acid, and similar re not fully oxidized, and by their accumula- their toxicity, set up morbid changes; and the formed is in its turn imperfectly oxidized, and tes; this diminished oxidation is due to a tional deficiency of oxidases, inherited or ac- —(Adami and McCrae's *Textbook of Pathol-*

BACTERIOLOGY.

THOGENIC SPIRILLA. *Spirillum choleræ* found in cholera; *Spirochæta recurrentis*, in relapsing nother variety of the same, in Congo tick fever; *ta pallida*, in syphilis; *Spirochæta refringens*, lis; *Spirochæta fusiformis*, in Vincent's angina. *cetoma*, or Madura foot, is a localized chronic tion, almost painless, and usually involving the hand, or some exposed portion of the body. ase involves the tissues by direct extension, the bones as well as the soft tissues. It emains localized to one extremity. It is due to *otothrix maduræ*. The black variety of Madura e to a different organism, the threads of which 8μ in thickness. This organism seems to be an s, and has been named *Madurella mycetori*." eal's *Pathogenic Microorganisms*.)

ogenic protozoa: The ameba of dysentery a *histolytica*), *Trypanosoma lewisi*, *Trypa- ansi*, *Trypanosoma brucei*, *Trypanosoma* , a trypanosoma probably causing kala-azar, *vivax*, *Plasmodium malariæ*, *Plasmodium* *Piroplasma* (various species pathogenic for and *Balantidium coli*.

eba is a rounded cell with a clear outer and a granular endoplasm. It has a rounded entric nucleus, and measures from 10 to 15μ . On the warm stage it shows active ame- ent. In the resting stage it forms a cyst in this state resists drying for a long time. ms are found chiefly in the large intestine,

excessive production of sugar in the liver, or to diminished oxidation by the tissues. On the other hand, Pavy holds that part of the ingested carbohydrates is converted by the intestinal villi into fat, and another part is synthetically built up into proteids, in which forms it reaches the blood, and that only a portion reaches the liver, where it is stored up as glycogen, and prevented from entering the general circulation except in synthetic combination with proteid bodies. A temporary glycosuria would therefore be due to a defect in the sugar-transforming mechanism, and diabetes to its arrest, permitting the passage of unaltered glucose. In mild forms of the disease, a diet free from carbohydrates stops the glycosuria, the excess of sugar being thus derived from the carbohydrates of the food; but in severer cases, glycosuria persists though carbohydrates are withheld, and sometimes even though no food is taken. In these instances, sugar is formed by disintegration of the proteids of the food, and in the gravest cases by disintegration of the body proteids. It remains to explain why the excess of sugar is not utilized by the tissues, is not, that is, oxidized in the ordinary manner by the muscles. It has been conjectured that it may require previous elaboration in other organs, and as the pancreas is in many instances diseased attention has been directed to that gland. The recent researches of the younger Cohnheim are suggestive in this regard. He finds that neither pancreatic juice nor muscle juice has singly any action upon sugar, but that when the two are combined the sugar is rapidly broken up. He holds, therefore, that the proenzyme produced in the muscles is only activated by a glycolytic substance contained in the pancreatic juice, and probably derived from the internal secretion of the islands of Langerhans. Extensive disease of the pancreas would destroy this substance, and render the sugar unavailable for combustion in the muscles. It must be added that, in some cases, no disease of the pancreas or liver has been found. In some of these there has been disease in the region of the "diabetic puncture" (floor of the fourth ventricle)."—(Wheeler and Jack's *Handbook of Medicine.*)

3. "*Gout* is a condition characterized by attacks of acute arthritis and other constitutional symptoms, clinically, by the excess of uric acid in the blood, and anatomically, by the deposit of sodium biurate in the cartilages and elsewhere. It must not be imagined that this excess of uric acid in the blood is the cause of the *disease, for* uric acid in excess exists in the blood in a

number of different states without gout being present. The urates are inert bodies, and the most that can be said is that they are an indicator; that is, the faulty metabolism which produces them produces also substances that are toxic. These substances we do not know with any exactness. . . . It is necessary to know, more fully than we do, the toxic effects of the purin bases, for they are toxic, and it is perhaps the purin bases that are responsible for gout. Gout, therefore, is probably the outcome of insufficient oxidation, whereby the precursors of the uric acid, and similar bodies, are not fully oxidized, and by their accumulation and their toxicity, set up morbid changes; and the uric acid formed is in its turn imperfectly oxidized, and accumulates; this diminished oxidation is due to a constitutional deficiency of oxidases, inherited or acquired."—(Adami and McCrae's *Textbook of Pathology.*)

BACTERIOLOGY.

1. PATHOGENIC SPIRILLA. *Spirillum choleræ* found in Asiatic cholera; *Spirochæta recurrentis*, in relapsing fever; another variety of the same, in Congo tick fever; *Spirochæta pallida*, in syphilis; *Spirochæta refringens*, in syphilis; *Spirochæta fusiformis*, in Vincent's angina.

2. "*Mycetoma*, or Madura foot, is a localized chronic inflammation, almost painless, and usually involving the foot, the hand, or some exposed portion of the body. The disease involves the tissues by direct extension, attacking the bones as well as the soft tissues. It usually remains localized to one extremity. It is due to the *Streptothrix maduræ*. The black variety of Madura foot is due to a different organism, the threads of which are 3 to 8μ in thickness. This organism seems to be an aspergillus, and has been named *Madurella mycetori.*" —(MacNeal's *Pathogenic Microorganisms.*)

3. *Pathogenic protozoa:* The ameba of dysentery (*entamœba histolytica*), *Trypanosoma lewisi*, *Trypanosoma evansi*, *Trypanosoma brucei*, *Trypanosoma gambiense*, a trypanosoma probably causing kala-azar, *Plasmodium vivax*, *Plasmodium malariæ*, *Plasmodium falciparum*, *Piroplasma* (various species pathogenic for animals), and *Balantidium coli.*

"The ameba is a rounded cell with a clear outer ectoplasm, and a granular endoplasm. It has a rounded or oval excentric nucleus, and measures from 10 to 15μ in diameter. On the warm stage it shows active ameboid movement. In the resting stage it forms a cyst or cysts, and in this state resists drying for a long time. The organisms are found chiefly in the large intestine,

especially in the rectum and flexures, but they also occur in the ileum and stomach, and in the liver. They have the power of penetrating the tissues."—(Wheeler and Jack's *Handbook of Medicine.*)

HYGIENE.

1. A *watershed* is the region from which a water supply is derived.

2. It can be properly safeguarded by preventing the discharge of sewage or waste into the source of water supply; also by purification.

3. The *water borne diseases* are: Typhoid, cholera, gastric and intestinal irritation, parasites, and diseases, diarrhea, dysentery, and (according to some) goiter.

4. Drinking water may be purified by distillation, or by filtration, and boiling.

5. Ground water may become polluted in its course through the soil, or after it has passed through the surface soil.

MEDICAL JURISPRUDENCE.

1. By *molecular death* is "understood the incessant disintegration of tissue which is going on in the body during the active processes of life; the waste of material thus produced being compensated by the reparation. In youth, the supply is in excess of the waste, and growth is the result; in advanced age, the reverse is the case. *Somatic death* is the cessation of all the vital functions of the body, or the death of the whole body. The latter is the popular idea of death, and the time when it takes place is generally recognizable. The precise period when universal *molecular* death occurs cannot be accurately determined. No doubt, molecular life may continue some time after somatic death, as is evidenced by postmortem temperature and muscular irritability, by the postmortem beating of the heart, and by certain acts of nutrition and secretion."—(Reese's *Medical Jurisprudence.*)

2. *Signs of death:* Complete and continuous cessation of circulation and respiration; loss of body heat; pallor; rigor mortis; cadaveric lividity; putrefaction; adipocere formation; and, occasionally, mummification. The presence of some of these signs of death marks the difference between real and apparent death.

3. For a complete answer to this question the reader must consult one of the standard works on pathology or medical jurisprudence.

4. *Causes of violent death:* Wounds, burns, and scalds, suffocation, hanging, strangulation, electricity, drowning, excessive heat or cold, starvation, and *poisoning.*

5. The *object of a coroner's inquest* is to discover the cause of death when the latter is unknown, or inexplicably sudden.

PRACTICE OF MEDICINE.

1. In *scurvy*, the cardinal symptom is the extravasation of blood beneath the periosteum, with resulting thickening and tenderness of the shaft of the bone. The pain in the legs, their position, and the spongy and bleeding gums are symptoms of nearly equal importance. The disease may be suspected in any child who has difficulty or pain in moving the legs, or in whom paralysis is suspected.

In *rachitis*, although the early stages may be indistinguishable, there soon develops the rachitic rosary and the enlargement of the ends of the long bones; pain is, as a rule, absent; and ecchymoses, petechiæ, and spongy gums are not observed. Both may coexist. —(Butler's *Diagnostics of Internal Medicine.*)

2. KINDS OF ARTERIAL PULSE. The normal pulse; the pulse of increased frequency, or tachycardia; the pulse of decreased frequency, or bradycardia; the intermittent or irregular pulse; the high tension pulse; the pulse with a wave of great volume; the slow, or tardy pulse; the dicrotic pulse.

3. *Catalepsy* is a condition characterized by muscular rigidity of the limbs; the affected limb will stay for a long time in the position in which it is placed; the patient is insensible.

EPILEPSY.	HYSTERIA.
1. No apparent cause.	1. Cause, emotional.
2. Sudden and rapid onset.	2. Onset gradual, usually after some mental excitement.
3. Aura generally present.	3. Globus hystericus or palpitation.
4. Consciousness lost.	4. Consciousness generally preserved.
5. Pupils generally dilated.	5. Pupils normal.
6. Tongue often bitten.	6. Tongue never bitten.
7. Patient very liable to hurt himself.	7. Patient not liable to hurt himself; may injure others.
8. May be involuntary bladder and bowel discharges.	8. Never.
9. Of short duration.	9. Duration longer.

4. The *common bile duct may be occluded* by: Gallstones; ulceration; parasites; foreign bodies; pressure from outside by tumor of pylorus or pancreas, abdominal tumors, aneurysm, or enlarged glands; cicatricial contraction following duodenal ulcer or syphilis of the liver.

5. VARIETIES OF STOMATITIS, WITH CAUSES. *Catarrhal stomatitis,* due to dentition or gastrointestinal disturbances in children, irritating or too hot food, and the acute infectious diseases. *Aphthous or follicular stomatitis;* canker, sore mouth is most common in infants and young children, either as an idiopathic affection or as a result of indigestion or a febrile attack; and occurs in adults when the general health is impaired. *Ulcerative or fetid stomatitis;* putrid sore mouth occurs most commonly in children during the first dentition, and may be epidemic, even in adults, in asylums, jails, and camps, where the hygienic conditions are poor. *Parasitic or mycotic stomatitis;* this affection (thrush, soor, muguet) is dependent upon the *Saccharomyces* (or *Oidium*) *albicans.* It occurs mainly in bottle-fed infants. Predisposing conditions are uncleanliness of the mouth and of feeding utensils, and cachectic or diseased states in general, in adults as well as children. *Gangrenous stomatitis;* cancrum oris or noma is a rare disease, affecting children of from 2 to 5 years of age, and occurring usually during convalescence from the acute fevers. More than fifty per cent. of the cases follow measles; less frequently it occurs after typhoid fever, scarlet fever, variola, and whooping-cough. Debilitated and cachectic states also predispose. The exciting cause is probably a yet unknown microorganism. *Mercurial stomatitis;* due to personal idiosyncrasies this may follow the use of repeated minute doses of a mercurial; or it may be an occupation poisoning. *Subvarieties of stomatitis;* in the newborn there may be small ulcers of the hard palate, symmetrically placed on either side of the median line, which may involve the bone (Parrot). Similar ulcers on the hard palate may be caused in marasmic children by the irritation of a rubber nipple (Bednar). Jacobi has described a chronic recurring herpetic eruption of the buccal cavity in neurotic persons, sometimes coexisting with erythema multiforme." —(Butler's *Diagnostics of Internal Medicine.*)

6. *Vocal fremitus* is the vibration of the chest communicated to the hands of the physician while the patient is speaking. It is *increased* in lobar pneumonia, tuberculosis of the lungs, and bronchopneumonia; it is

decreased in pleural effusions, emphysema, collapse of the lung, tumors of the lung, and pulmonary edema.

7. *Urinary casts* are moulds of the uriniferous tubules of the kidney. *Epithelial tube casts* are found in desquamative nephritis. *Blood casts* are found in acute renal hyperemia, acute nephritis, hemorrhagic infarction, and renal hematuria. *Pus casts* are found in suppurative nephritis and pyelitis. *Bacterial casts* are found in pyelonephritis and suppurative nephritis. *Granular casts* are found in chronic degenerative processes of the kidneys. *Fatty casts* are found in subacute or chronic nephritis with fatty degeneration, especially large white kidney. *Hyaline casts* are found in all inflammations, acute or chronic, of the renal tubules. *Waxy casts* are found in subacute or chronic nephritis. —(From Butler's *Diagnostics of Internal Medicine.*)

8. *Smallpox:* The eruption usually appears first on the forehead and wrists, and on the third or fourth day; it is first macular, then papular, then vesicular, and finally pustular; it does not appear in successive crops; the spots are multilocular, and do not collapse on being punctured; the papule is hard and shotty, and does not disappear on stretching the skin.

Scarlet fever: Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. As compared with smallpox and measles, the eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent. *Measles:* Character of eruption, small, dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. As compared with scarlet fever, the eruption is darker, less uniform, more shotty; Koplik's spots are present.

9. *Pathological sounds heard on auscultation of the lungs: "Bronchial breathing* occurs in *lobar pneumonia*, phthisis, compensatory emphysema, tumor, syphilis, and infarct. Both inspiration and expiration are harsh and have a high-pitched (tubular) character. *Cavernous breathing* is low-pitched and blowing in character and is heard over cavities. *Amphoric breathing* is similar to the sound produced by blowing gently over the mouth of an empty jar. It is present in phthisical cavities, pneumothorax with patulous opening, and localized consolidation near a large bronchus. Adventitious sounds include râles, metallic tinkling, and

pleuritic friction sound. Râles may be dry or moist: *Dry râles* occur in bronchitis and asthma, and may be low-pitched snoring sounds (sonorous râles) or high-pitched whistling sounds (sibilant râles). *Moist râles* are produced by the passage of the air through liquid, and may be crepitant, subcrepitant, or gurgling in character. *Crepitant râles* are extremely fine and occur at the end of inspiration; they are heard in the first stage of pneumonia and in engorgement and edema of the lungs. *Subcrepitant râles* are comparatively few in number, and are heard during inspiration and expiration, in capillary bronchitis, pulmonary edema, hypostatic pulmonary congestion, and incipient phthisis. *Gurgling râles* may be large or small, and are heard during inspiration and expiration in phthisical cavities, bronchial hemorrhage, in the stage of secretion in bronchitis, and over the trachea. *Metallic tinkling* is a bell-like sound heard in pneumothorax and phthisical cavities, and is caused by the dropping of a liquid through the space inclosed in tense walls. The *succussion splash* is produced in pneumothorax when the patient is suddenly shaken. *Pleuritic friction sounds* are heard during inspiration and expiration, and do not pass away after coughing. They are pathognomonic of pleurisy."—(*Cyclopedia of Medicine and Surgery.*)

10. The first, or systolic, sound is dull and somewhat prolonged; the second, or diastolic, is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.* The first is heard best in the fifth left intercostal space; the second over the second right costal cartilage.

OBSTETRICS.

1. The diameters and measurements of the female pelvis are easily remembered from the following table:

	Antero-posterior	Oblique	Transverse
Brim	4 inches	4½ inches	5 inches
Mid-plane	4½ "	4½ "	4½ "
Outlet	5 "	4½ "	4 "

In external pelvimetry four measurements are generally taken: (1) between the anterior superior spines of the ilium, normally about ten and a quarter inches; (2) between the external edges of the iliac crests, normally about eleven inches; (3) between the heads of the two great trochanters, normally about twelve and a quarter inches; and (4) between the spinous process of the last lumbar vertebra and the upper margin of the anterior surface of the symphysis pubis, normally *about eight inches.*

"The *conjugata vera*, or true conjugate, is measured from the center of the promontory of the sacrum to that point on the posterior surface of the upper end of the symphysis pubis which is crossed by the iliopectineal line. This is the shortest diameter at the brim through which the head must pass. It cannot be accurately measured, but is estimated in the normal pelvis at 10.5 to 11 centimeters (4¼ to 4½ inches). The *diagonal conjugate* is measured from the summit of the subpubic arch, or the subpubic ligament, to the promontory of the sacrum; it is from this diameter that we estimate the true conjugate. To estimate the true conjugate from the diagonal, we deduct from ½ to ¾ of an inch (1.5 to 2 centimeters). The amount to be deducted depends (*a*) on the depth of the symphysis pubis—the greater the depth the greater must be the allowance; (*b*) on the thickness of the pubic symphysis, for increase in the thickness increases the allowance to be subtracted; (*c*) on the inclination of the symphysis and the inclination of the brim of the pelvis, for when the promontory is high a greater deduction must be made."—(Polak's *Manual of Obstetrics.*)

The smallest conjugate diameter which will permit of natural delivery is probably about three inches.

2. *Mechanism of Labor in L. O. A.*—"(1) Accommodation of the size of the fetal skull to the size of the pelvic canal by flexion; accommodation of the shape of the fetal skull to the shape of the pelvic inlet by moulding; accommodation of the direction of the head to the direction of the pelvic canal by lateral inclination. These movements occur prior to labor, when the head enters the pelvic inlet with the subsidence of the uterus. (2) Further flexion, molding, and accommodation of the head to the pelvis by lateral inclination, when labor-pains appear, and the head is subjected to a propulsive force and to the resistance of the lower uterine segment, the cervix, and the pelvic walls. (3) Dilatation of the lower uterine cavity and of the cervical canal. (4) Descent of the head to the pelvic floor, mainly by an extension of the fetal spine. The fetal body, as a whole, is not yet propelled along the birth-canal, because, during a pain and while the head is obviously descending to the pelvic floor, the fundus uteri and the breech do not sink to a lower level. On the contrary, there is a slight elevation of the fundus, and elongation of the uterus, and the distance between the head and the breech increases during a uterine contraction. (5) Anterior rotation of the occiput. (6) Propulsion and extension of the head in the direction of least resistance

under the pubic arch until it is delivered, again following the direction of the lower pelvic floor, which is now upward, forward, and outward. (7) Restitution. The rotary movement of the head is not followed by the shoulders. As the former escapes from the vulva with the sagittal suture running anteroposteriorly, the neck is necessarily twisted. As soon as the head is released from the forces which compel its rotation, it immediately resumes its natural relationship with the shoulders, which lie with their long axis in the oblique diameter of the pelvis. (8) External rotation. This movement of the head is explained by the movement of the shoulders within the birth-canal. (9) Descent, rotation, and birth of shoulders. The anterior, or right, shoulder first strikes the resistance of the pelvic floor. In obedience to the universal law that whatever portion of the fetal body first encounters this resistance is directed downward, forward, and inward, the anterior shoulder is compelled to travel in these directions by a rotary movement of the shoulders on the spine. The anterior shoulder finally appears under the arch of the symphysis; unable to move further forward, the posterior shoulder and arm are propelled over the floor of the pelvis and are born, their escape being followed by the birth of the anterior shoulder and arm. (10) Delivery of remainder of the body by a movement so rapid that the eye cannot well follow it, the birth-canal being so widely dilated that its walls offer no resistance to the escape of the small and compressible thorax, abdomen, and lower extremities."—(From Hirst's *Obstetrics.*)

3. "*Treatment of uterine inertia:* Endeavor to ascertain and remove the cause. Place the woman under the best hygienic conditions. If the source of reflex disturbances cannot be removed, we may quiet the nerve center by chloral, opium, or the bromide of potassium, after which the inertia is commonly relieved. When the patient is suffering from fatigue during a protracted labor, quinine is of great use. Massage and stroking of the uterus through the abdominal walls may be tried. If over-distention exists we should early rupture the membranes."—(Landis' *Obstetrics.*)

4. POSTPARTUM HEMORRHAGE. *Causes:* Anything interfering with the firm contraction of the uterus after the expulsion of the child; retained placenta, or membrane, or clots; weakness of the uterine muscle; rapid labor; delayed labor; poorly developed uterine muscle; inflammation or disease of uterus.

Treatment: Grasp the uterus at once, through the ab-

dominal wall, and massage it firmly. Anything in the uterus should at once be cleaned out. Pass one hand into the uterus, and with the other on the outside make firm pressure. A hypodermic of ergotin or ergot can be given by an assistant. An intrauterine douche of hot sterilized water (about 115° F.) may be given. Sometimes a very thorough packing and plugging of gauze of uterus and vagina may be necessary. Whatever is done must be done promptly; and everything likely to be needed for this emergency should be prepared beforehand in every labor.

5. In cases of *shoulder presentation*, if seen before labor, version should be performed to correct the malpresentation; in case of impaction a cesarean section is indicated; sometimes decapitation or embryotomy has been performed, but a cesarean section is preferable. Cases of shoulder presentation have been known to terminate spontaneously, but it is not advisable to rely on this possibility.

6. The chief causes are hydramnios, hydrocephalus, contracted pelvis, malpresentation.

"*Treatment:* Empty the bladder and rectum; determine if there is a faulty presentation, as bregma, brow, or face. Measure diagonal conjugate and height of symphysis and determine the true conjugate. If this latter measures less than 2¾ inches in a simple flat pelvis, or three inches in generally contracted pelvis, the contraction is absolute, and only cesarean section or craniotomy is possible. Ascertain by palpation whether there is serious disproportion between head and pelvis. Malpresentations must be corrected with one hand in vagina pressing upward on the fetal anterior portion of the presenting part, and if possible drawing down in the occipital pole, aided by external manipulation. Press the head downward into the pelvis; this maneuver may be aided by Walcher's position. If there is marked disproportion, cesarean section and craniotomy must be considered. If disproportion is apparently not insuperable, rupture the membranes just after the acme of a pain, when the cervix is fully dilated, keeping the patient in Walcher's position. If the head thereupon engages during the next few pains, allow spontaneous delivery, or aid with forceps, if necessary. If the head still refuses to engage, apply axis-traction forceps in Walcher's position, tentatively; if unsuccessful, perform podalic version by combined or internal method. If membranes have already ruptured, note whether there is marked retraction ring. If not, podalic version is proper, subject to limitation of

slight disproportion; but if the uterus has retracted markedly, forceps, and that failing, only cesarean section, symphyseotomy, or craniotomy is admissible."—(From Scott's *State Board Obstetrics.*)

GYNECOLOGY.

1. Tuberculous cystitis and gonorrheal cystitis.

TUBERCULOUS CYSTITIS.	GONORRHEAL CYSTITIS.
1. Located chiefly about the trigone.	1. Not at all so confined.
2. Inflammatory reaction zone absent or not well defined.	2. Clear inflammatory reaction zone, later changing to dull-brown color.
3. Tuberculous cystitis not common.	3. Common.
4. Characterized by presence of small tubercles situated about the trigone and ureteral orifices.	4. Characterized early by insular areas of reactive inflammation, with healthy or nearly healthy intermediate mucosa. Later insular areas may become confluent and extend over the whole mucosa.
5. No projecting tufts of pus.	5. Projecting tufts of gonorrheal pus are apt to be present. In chronic stage regions of elevation may be excavated by ulceration.
6. No subperitoneal extravasation of blood.	6. In very acute stage there is subperitoneal extravasation of blood.
7. Bacillus tuberculosis.	7. Gonococcus.

—(Dudley's *Gynecology.*)

2. In *subinvolution of the uterus* there will be a history of a more or less recent pregnancy, with prolonged labor or puerperium; the uterus is larger than normal, and there may be hemorrhage and leucorrhea.

In *chronic metritis* the uterus is uniformly enlarged, and is of uniform hardness; the enlargement is moderate; there is tenderness on pressure; generally there is a history of infection.

In *uterine fibroid*, the uterus may be enormously enlarged, the enlargement is irregular, and the fibroids are generally harder than the uterus; no tenderness on pressure; and no history of infection.

3. TUBAL PREGNANCY. "Prior to the fourth month the three cardinal and practically constant points in the diagnosis of beginning extrauterine pregnancy are (1) disturbance of menstruation, (2) sharp pelvic pain, usually accompanied with faintness, and (3) the presence of a mass adjacent to and connected with the uterus. Certainty of diagnosis is based upon a logical analysis of these three factors."—(Jewett.)

The *possible terminations* are: Rupture of the tube, followed by hemorrhage, shock, peritonitis, and perhaps death; tubal abortion; and continuance of the pregnancy to term.

4. *Blood supply of the uterus:* The uterine and ovarian arteries.

Blood supply of the ovaries: The ovarian arteries.

SURGERY.

1. A *compound fracture* is one in which an open wound extends from the seat of the fracture to the surface of the body.

A *comminuted fracture* is one in which the bone is broken into many fragments.

A *complicated fracture* is a fracture with the addition of some injury to neighboring structures, such as joint, artery, vein, nerve, or soft parts.

Treatment of simple fracture: "In simple fractures there are four essentials: (1) Reduction; (2) coaptation; (3) immobilization; (4) promote the nutrition of the part and prevent adhesions in the neighboring joints and muscles."

Treatment of compound fractures: "The most important thing is to render the wound aseptic by enlarging it and washing its depths and surroundings thoroughly with 1 in 20 carbolic or 1 in 500 biniodide. An anesthetic is nearly always necessary. Loose fragments should be removed, hemorrhage dealt with, and the bones fixed by wires or screws. The wound should be drained by a tube at the most dependent spot, and the rest of the wound closed. The limb should then be fixed on a splint, and in most cases will be found to do well."—(*Aids to Surgery.*)

2. "Acute epididymitis is characterized by swelling about the testicle, pain in the groin, and tenderness over the posterior part of the testicle. The pain becomes acute, swelling rapidly increases, and the constitution

sympathizes. The swelling is due partly to engorgement of the epididymis and partly to fluid in the tunica vaginalis (acute hydrocele).

"*Treatment* by septic puncture with a tenotome, if fluctuation is marked, will relieve tension and pain. Leeching over the external abdominal ring, the use of an ice-bag, elevation, application of guaiacol, and administration of laxatives and opium constitute the usual treatment in the acute stage. Applications of guaiacol over the cord, epididymis, and testicle seem to relieve pain and distinctly lessen swelling. Two applications a day should be made for one week. At each application paint the scrotum and over the external ring with 15 drops of guaiacol in one dram of glycerin or olive oil. Strapping is employed as the inflammation subsides."—(Da Costa's *Surgery.*)

3. *Stone in the ureter* is characterized by: Severe colic, with pain radiating along the ureter; tenderness over the ureter; hematuria; the stone may be felt through rectum or vagina; a skiagram may show the stone; ureteral catheterization through the cystoscope may allow of the stone being touched by the catheter, and a waxed tip may receive a scratched impression.

4. *Pott's fracture* is very common, and is due to indirect violence, such as turning over on the inside of the foot. The strain tears through the internal lateral ligament of the ankle or tears off the tip of the malleolus; then the astragalus is pressed against the inner side of the external malleolus by the continuation of the violence. The fibula is overbent, and breaks about three inches above the tip of the malleolus. At the same time the foot is displaced outward or outward and backward. In many cases, however, the displacement is slight.

Treatment: "An anesthetic should always be given, and the fracture reduced by relaxing the calf muscles and applying traction to the foot. The limb must then be fixed on the back-splint, with side-splints in addition. The foot must be at right angles to the leg, the bony points in line, and the posterior displacement corrected. The surest way of maintaining the foot in good position is to at once apply plaster of Paris. Other splints used are Dupuytren's and Syme's horseshoe splint. Massage and passive movement at the end of ten days are advisable, the fragments being firmly grasped to prevent displacement."—(*Aids to Surgery.*)

5. "*Congenital dislocation of the hip* is usually due presumably to arrested development. It may be inherited. It occurs more frequently in females. It is

seldom apparent until the child begins to walk. Rarely it occurs during birth due to cramped position of the child *in utero*. The dislocation results in atrophy of the acetabulum, the cavity becoming more and more shallow, and of the head of the femur which rests behind the acetabulum on the dorsum of the ilium. The neck of the femur and the thigh muscles are shortened. The capsule is stretched, an hourglass constriction sometimes being found between the head and the pelvic bone. In unilateral dislocation there is scoliosis and limping; in bilateral, there is a waddling gait and lordosis."—(*Pocket Encyclopedia.*)

6. *Symptoms simulating those of appendicitis* may be found in: Gastroenteritis, intestinal obstruction, typhoid fever, gastric ulcer, duodenal ulcer, salpingitis, ovaritis, kinking of ureter, renal colic, hepatic colic, ruptured extrauterine pregnancy, peritonitis.

7. *Clinical aspect of a beginning carcinoma of the female breast:* "Scirrhous carcinoma is usually met with in women between the ages of thirty-five and fifty, and it often begins while the patient is still menstruating regularly. It sometimes occurs in patients below thirty. The most common site is the upper and outer quadrant of the breast, but it may occur in any part of the gland. Sometimes there is more than one nodule in the breast. In its early stages the condition is quite painless, and the existence of the tumor is usually discovered accidentally. In some cases indrawing of the nipple or dimpling of the skin over the breast first attracts attention. It is often noticed that there is a difference in the level of the two nipples, that of the affected breast being at a higher level than the other (Watson Cheyne). As the disease progresses the patient experiences a dull, aching pain, with occasional sharp twinges shooting through toward the shoulder, up into the neck, or down the inner side of the arm. On palpation, a more or less circumscribed and fairly well-defined tumor of stony hardness may be felt in the substance of the breast. Not being encapsulated, it cannot be moved apart from the breast. When firmly pressed against the chest wall with the flat of the hand the tumor becomes more evident, and its stony hardness is fully appreciated. The skin over the growth may for a long time remain free, but, as the disease progresses, it becomes tacked down, and is later dimpled by contraction of the suspensory ligaments of Cooper. When the skin becomes invaded by the tumor it assumes a characteristically coarse and indurated appearance, aptly compared to that of the skin of an

orange or to pig's skin. When the tumor is near the center of the breast, it causes retraction of the nipple by dragging on the large ducts. It cannot be too strongly emphasized that the presence of all or any of these symptoms is not necessary for the diagnosis of cancer, and that when there is any doubt the patient should be given the benefit of an exploratory operation." —(Thomson and Miles' *Manual of Surgery.*)

8. *Hernia* is the protrusion of a viscus or other structure, either in whole or in part, through the cavity in which it is normally placed.

Varieties of abdominal hernia: Inguinal (oblique and direct; the oblique may be congenital, acquired, or infantile); femoral; umbilical; ventral, and postoperative.

9. The *symptoms of gallstones* are: "*Indefinite pains;* fullness in right hypochondrium and epigastrium. *Paroxysms of colic* begin in hypochondriac and epigastric regions, spread toward navel and right scapula; generally begin in daytime, during exercise, and last a few minutes to several hours; collapse, sickness, or vomiting. *Sickness and malaise,* quite independent of colic. *Vomiting.*—At end of paroxysm; bile-stained vomit; calculus is rarely vomited. *Collapse.*—Feeble pulse; clammy skin, low temperature. *Calculi in feces.* —Absence in some cases accounted for by stone having failed to reach the intestine. *Jaundice.*—Usually occurs 12 to 36 hours after colic; skin, urine, conjunctiva are yellow; feces are clay colored and offensive; rarely, and in old people, jaundice occurs without preceding colic; does not occur when stone is in cystic duct; is partial, *i.e.* feces contain bile when obstruction is partial, or when fistulous communication exists. *Temperature.*—Sometimes rigors, with temperature 103° or more, occur after colic; probably due to septic infection at seat of ulceration; fever may be of an intermittent type, associated with catarrh of bile-ducts and an impacted calculus; may be remittent, and lead on to septicemia or septic endocarditis; associated with suppuration in bile-ducts."—(*Synopsis of Surgery.*)

10. *Hypothyroidism* is the condition produced by absence or diminution in the secretion of the thyroid gland. The *symptoms* are: "(1) *Changes in the subcutaneous tissues.*—Great increase of fat and mucoid tissue; the hair is brittle and falls out; supraclavicular fatty masses are very conspicuous. (2) *Changes in the nervous system.*—Amentia or dementia are prominent; in the case of cretinism a state of childishness or imbecility continues throughout life unless

the case is treated. (3) *Changes in the skeleton.*—The terminal phalanges become broad and spatulous; in cretinism growth is arrested, so that the stature of the adult is that of a child of about six. (4) *Changes in the genital organs.*—The cretin has undeveloped sexual glands, undescended testes, and no secondary sexual characters; in myxedema sexual feeling and power are lost."—(*Synopsis of Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

THE UNIVERSITY OF THE STATE OF NEW YORK.

Answer a total of ten of the questions on each paper, but no more.

ANATOMY.

1. Define the following terms: (a) diploe, (b) epiphysis, (c) medullary cavity, (d) Haversian canal, (e) tuberosity.
2. Give the origin of the muscles inserted in the tuberosities and bicipital groove of the humerus.
3. In what vessel does *each* of the following terminate: (a) lateral sinus (*sinus transversus*), (b) internal saphenous vein (*vena saphena magna*), (c) brachial vein (*vena brachialis*), (d) hepatic vein (*vena hepatica*)?
4. Give the minute anatomy of lung tissue.
5. Name the spinal nerves entering into the formation of plexuses and state the plexus with which each is connected.
6. Name and describe (a) the lobes of the liver, (b) the fissures that divide them.
7. Describe the intercostal arteries and give their relations.
8. Describe the development of the femur, and state when (at what time of life) the epiphyses join the shaft.
9. Describe the endocardium.
10. Describe the spermatic cord (*funiculus spermaticus*).
11. Name *three* layers that are differentiated at the embryonic area in the development of the ovum, and mention the structures developed from each.
12. What is (a) the cauda equina, (b) the foramen of Winslow, (c) the optic thalamus, (d) the trigonum vesicæ, (e) the Eustachian tube?

PHYSIOLOGY.

1. Name the automatic centers located in the medulla oblongata.

2. What is the ratio between the respiration and the pulse? What is the average measurement of the adult male chest in (a) deep expiration, (b) complete inspiration?

3. Name the superficial reflexes. Describe a test that may be applied to ascertain the integrity of *each* of the superficial reflexes.

4. Explain the physiology of the accepted fresh air and dietetic treatment of tuberculosis.

5. Name, in order of importance, the avenues through which the heat of the body is lost.

6. Describe in detail the changes undergone by food in the stomach.

7. Give in pounds the normal quantity of blood in an individual weighing 150 pounds.

8. Name the chemical elements that are constant in the human body.

9. State the function of the secretions of the prostate and Cowper's glands.

10. What changes take place in the composition of the blood as it passes through the kidneys?

11. What are the general functions of fat within the body?

12. Describe the physiology of the contraction of a muscle fiber.

CHEMISTRY.

1. What are the alkali metals? Give the valences and the general characteristics of the alkali metals.

2. Describe iodine giving (a) its occurrence in nature, (b) its properties, (c) its therapeutic uses.

3. What is amyl nitrite?

4. Describe a test for lactic acid in the stomach contents.

5. What are proteins? Where in the body are proteins found? Name the chief proteins.

6. Give a test for (a) glucose in the urine, (b) uric acid in the urine.

7. Define water of crystallization. Distinguish between deliquescence and efflorescence.

8. Describe a method of preparation of hydrogen sulphide. What are the properties of hydrogen sulphide?

9. Differentiate between alloy and amalgam.

10. What is wood alcohol? Give the formula and the properties of wood alcohol.

11. What are fatty acids? Name *three* fatty acids.

12. Give the formula for (a) saltpeter, (b) Chile saltpeter, (c) blue vitriol, (d) green vitriol.

NEW YORK.

HYGIENE AND SANITATION.

1. What are the first two duties of a physician when called to attend a case of communicable disease?
2. What principles must be observed in the safe storage of rain water for a drinking supply?
3. What features should be considered in locating and constructing a privy on the premises of a village schoolhouse?
4. Give the maximum period of incubation in *each* of the following diseases: (a) smallpox, (b) scarlet fever, (c) whooping cough.
5. What diseases may be conveyed through cow's milk?
6. Give the theory of the application of vaccination against smallpox.
7. Name *five* diseases that may be contracted by eating uncooked meat.
8. What *five* common metallic substances are factors in the production of occupational diseases?
9. Give in detail the method used in the United States for accomplishing the registration of marriages.
10. How may Vincent's angina be positively diagnosed? With what communicable disease is it most frequently confused?
11. What are the purposes for which the Binet-Simon test is employed?
12. What are the two most important factors to be observed in preventing the occurrence of bubonic plague?

SURGERY.

1. Describe gangrene of the foot due to diabetes.
2. Give the symptoms and the surgical treatment of the early stage only of tuberculosis of the hip joint.
3. State *two* effective methods of controlling hemorrhage from the popliteal artery, when without access to surgical instruments.
4. Give the technic of lumbar spinal puncture.
5. Describe the operation of thoracotomy for empyema.
6. Describe a radical operation for epithelioma of the lower lip (omit aseptic technic).
7. Give the clinical picture of an acute osteomyelitis of the tibia.
8. What is the treatment of impacted fracture of the head of the femur?
9. Give the clinical history of a case of chronic appendicitis.
10. Discuss the surgical management of gunshot wound of the abdomen.

11. State the most common form of dislocation of the shoulder, and give Kocher's method of reduction.
12. Describe and diagnose femoral hernia.

OBSTETRICS AND GYNECOLOGY.

1. Give the etiology of hemorrhage appearing externally after the birth of the child.
2. Describe the management of the third stage of labor in normal delivery.
3. What is placenta prævia? Give its varieties and its management.
4. What is concealed accidental hemorrhage? Give its etiology and its diagnosis.
5. Describe methods of examination of the female organs of generation.
6. What is the recognized normal position of the uterus? By what means is it retained in this position.
7. Describe the separation of the placenta.
8. What is erosion of the cervix? Give its etiology and its management.
9. What hygienic care should be observed at the period of pubescence?
10. What is accouchement forcé? When is it indicated?
11. Describe uterine polypi. Give their origin and their histologic composition.
12. What are the causes of venereal warts? Give treatment.

PATHOLOGY.

1. Describe ophthalmia neonatorum.
2. What portion of the uterus is the most common initial site of malignancy?
3. Give the technic of making a red blood count.
4. Give the pathology of erysipelas.
5. Give briefly the urinary findings, both chemical and microscopical, in chronic parenchymatous nephritis.
6. What changes take place in an inflamed part, causing redness and swelling?

BACTERIOLOGY.

7. Describe in detail how you would examine spinal fluid for meningococci, morphologically and culturally.
8. How would you determine whether or not a sore throat is caused by the diphtheria bacillus? Give details of procedure.
9. Describe a method of staining tubercle bacilli. *How could* you isolate the bacilli from chest fluid?

10. What is a typhoid carrier? How can it be ascertained bacteriologically that an individual is a typhoid carrier?

11. What is meant by active immunization? Give an example in which this principle is applied to the prophylactic immunization of man.

12. What is the principle underlying Pasteur's method of treatment of an individual who has been bitten by a mad dog?

DIAGNOSIS.

1. What are the symptoms of intracranial hemorrhage (apoplexy)?

2. Differentiate a syphilitic mucous patch from an aphthous ulcer of the buccal mucosa.

3. Describe the physical signs produced by pulmonary tuberculosis in its incipient stages.

4. Differentiate between aortic stenosis and mitral insufficiency.

5. Describe the renal conditions resulting from arteriosclerosis and give their symptoms.

6. Describe the symptoms and the clinical course of alcoholic cirrhosis of the liver.

7. Give the symptoms produced by deflections of the nasal septum.

8. In what disease conditions is there an increase in the number of leucocytes in the blood (hyperleucocytosis)? Mention *three* common disease conditions in which the number of leucocytes is stationary or lessened (leucopenia).

9. What symptoms indicate a perforation of the bowel in the course of typhoid fever?

10. What are the symptoms of myxedema and of what is it significant?

11. Mention *two* conditions in which wrist drop is an important symptom.

12. Describe the physical signs present in lobar pneumonia and the modifications to be noted in the different stages of the disease.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

THE UNIVERSITY OF THE STATE OF NEW YORK.

ANATOMY.

1. *Diploe* is the cancellous tissue found between the outer and inner layers of the flat bones.

Epiphysis is a bony process which was developed

separately from the bone and afterwards joined the bone.

Medullary cavity is the hollow part in the center of a long bone, and which contains the marrow.

Haversian canal is the central canal of a Haversian system.

Tuberosity is a non-articular, rough, broad prominence of a bone.

2. To the *greater tuberosity of the humerus*, there are attached, the Supraspinatus (*origin* from Supraspinatus fossa of scapula and supraspinatus fascia), infraspinatus (*origin* from infraspinatus fossa of scapula and infraspinatus fascia), and Teres minor (*origin* from dorsal surface of axillary border of scapula). To the *lesser tuberosity*, the Subscapularis (*origin* from subscapular fossa and axillary border of scapula). To *bicipital groove*, the Latissimus dorsi (*origin* from six lower thoracic vertebræ, lumbar fascia, crest of ilium, and from lower three or four ribs).

3. The *lateral sinus* terminates in the internal jugular vein; the *internal saphenous vein* terminates in the femoral vein; the *brachial vein* terminates in the axillary vein; the *hepatic vein* terminates in the inferior vena cava.

4. *The structure of the lungs.*—"In the lungs the bronchi branch in a tree-like manner, the final ramifications opening into the pulmonary cells. The larger intrapulmonary bronchi are lined by columnar ciliated epithelium resting on a basement membrance. Lying under this basement membrane are longitudinally disposed elastic fibers with loose connective tissue. More externally is a layer of smooth muscle fibers arranged circularly, the bronchial muscle. External to the bronchial muscle is a fibrous coat containing scattered, irregular plates of hyaline cartilage. The smaller bronchi (bronchioles) have no cartilaginous plates, but their muscular coat is well marked. Each bronchiole leads into a small number (three or four) of wider thin-walled spaces, lined by flattened epithelium, and called atria. Out of each atrium open two or three blind diverticula, each of which is called an infundibulum. The walls of the infundibula are studded with hemispherical sacs known as alveoli, which are lined by flattened, non-nucleated, epithelial cells. Between adjacent alveoli there is a dense network of capillaries, supported by a small amount of fine connective and elastic tissue; the network of capillaries is thus common to the two adjacent air cells, and the blood in the capillaries is separated from the air in the alveoli merely by two thin

layers of epithelium. In birds, even the alveolar epithelium appears to be absent, the blood and air being separated solely by the capillary wall."—(Bainbridge and Menzies' *Essentials of Physiology.*)

5. The first four spinal nerves enter into the formation of the *cervical plexus;* the fifth, sixth, seventh, and eighth cervical and the first thoracic nerves enter into the formation of the *brachial plexus;* the first four lumbar nerves enter into the formation of the *lumbar plexus;* the fourth and fifth lumbar, first, second, third, fourth, and fifth sacral, and the coccygeal nerves enter into the formation of the *sacral plexus.*

6. The *lobes of the liver* are: Right lobe, left lobe, lobus quadratus, lobus caudatus, and Spigelian lobe (the last three are subdivisions of the right lobe). The *fissures of the liver* are: Umbilical fissure, fissure for the ductus venosus, transverse fissure, fissure for the gall bladder, and fissure for the inferior vena cava.

"*Right and left lobes* are separated from each other by the umbilical fissure on the under surface, and posteriorly by the fissure of the ductus venosus. The right is the larger, and contains the transverse fissure and fissure for the vena cava; is subdivided into the three following lobes:

"The *lobus quadratus:* bounded by the umbilical and transverse fissures and the fossa of the gall bladder.

"The *lobus Spigelii* is on the posterior surface, and is the projection between fissures for the inferior vena cava and ductus venosus, behind the transverse fissure.

"The *lobus caudatus* connects the preceding lobe with the main mass of the right lobe, and lies behind the transverse fissure.

"The *longitudinal fissure* is occupied by the round ligament, and divides the organ into right and left lobes; it is separated into two parts by its union with the transverse fissure.

"The *anterior* part or *umbilical fissure* contains the remains of the umbilical vein, and lies between the left lobe and the lobus quadratus. The *posterior* part or *fissure of the ductus venosus* lies between the left lobe and the lobus Spigelii, and contains the remains of the ductus venosus.

"The *transverse* or *portal fissure* is placed at right angles to the longitudinal fissure, between the lobus quadratus and the lobus Spigelii, and lodges the hepatic duct, artery, and portal vein, nerves, and lymphatics. The artery lies between the duct in front, and the vein behind.

"The *fissure for the vena cava* is placed obliquely at

the posterior margin of the liver, behind the gall bladder, lying between the right lobe and the lobus Spigelii, and separated from the transverse fissure by the lobus caudatus. The hepatic veins enter the vena cava at the bottom of this fissure."—(*Aids to Anatomy.*)

7. "The *superior intercostal* artery arises from upper and back part of the subclavian, behind scalenus anticus, bends backward over pleural dome in front of neck of first rib to first and second intercostal spaces, supplies small branches to cord and deep spinal muscles. On the neck of the first rib, the first intercostal nerve is external, and first thoracic ganglion of sympathetic, internal to artery.

"The *thoracic intercostals* (nine pairs) arise from posterior part of aorta, run transversely outward on bodies of vertebræ, and behind pleura to intercostal spaces. The right ones, crossing over front of spine, supply the bodies of vertebræ and pass behind the esophagus, thoracic duct, and azygos veins. The arteries of both sides are crossed by sympathetic chain and its splanchnic branches. On reaching intercostal spaces, they divide into anterior and posterior branches; the *anterior* branch crosses the space obliquely upward so as to get to lower border of the upper rib near the angle: at first it lies between external intercostal and fascia, subsequently between two intercostal muscles; anastomose with anterior intercostal of internal mammary, thoracic branches of axillary. Above the artery is a companion vein, and below the intercostal nerve. The *posterior* branch passes backward between vertebræ and superior costotransverse ligament, sending inward, *spinal* branch through intervertebral foramen to cord, membranes and body of vertebræ, and backward, *muscular* branch which divides into inner and outer branches to muscles of back. A branch, *the collateral intercostal*, is given off near the angle of the rib, which runs along the upper border of the lower rib. Branches accompany the lateral cutaneous nerves of the thorax from the main trunks of the intercostals. The three lower branches pass forward between muscles of abdominal wall; anastomose with epigastric and phrenic."—(*Aids to Anatomy.*)

8. "*The femur is developed* by *five* centers: one for the shaft, one for each extremity, and one for each trochanter. Of all the long bones, except the clavicle, it is the first to show traces of ossification: this commences in the shaft, at about the seventh week of fetal life, the centers of ossification in the epiphyses appearing in the following order: First, in the lower end of

the bone, at the ninth month of fetal life (from this the condyles and tuberosities are formed); in the head at the end of the first year after birth; in the great trochanter, during the fourth year, and in the lesser trochanter, between the thirteenth and fourteenth. The order in which the epiphyses are joined to the shaft is the reverse of that of their appearance: their junction does not commence until after puberty, the lesser trochanter being first joined, then the great, then the head, and, lastly, the inferior extremity (the first in which ossification commenced), which is not united until the twentieth year."—(Gray's *Anatomy*.)

9. "The *endocardium* is a serous membrane that covers the inner surface of the heart. Histologically it consists of two layers, an inner lining of simple squamous epithelial cells (endothelium or mesothelium), and an outer layer composed of connective-tissue fibers, connective-tissue cells, and smooth muscle cells. The endocardium is reflected over the heart valves where the smooth muscle is particularly abundant."—(Hill's *Histology*.)

10. The *spermatic cord* consists of the vas deferens with artery to the vas, spermatic artery, and pampiniform plexus of veins forming spermatic vein above, sympathetic nerves, the cremasteric artery, the genital branch of the genitocrural nerve, lymphatics, together with some areolar tissue; it extends from the internal abdominal ring to the testis, passing in its course along inguinal canal, from which it emerges by the external abdominal ring, and thence in front of the pubes to the scrotum. The vas deferens is placed at the back of the cord.

11. *The three layers of the blastoderm* are: The epiblast, mesoblast, and hypoblast.

From *the epiblast* are derived: The skin, and its appendages (hair, nails), and glands (including the mammary glands); the nervous system (brain, spinal cord, ganglia and nerves); the epithelial parts of the organs of special sense.

From *the mesoblast* are derived: The skeleton, connective tissues, muscles and bones, heart, blood-vessels, lymphatics, and spleen; the urinary and generative organs.

From *the hypoblast* are derived: The epithelial lining of the alimentary canal and its glands; the epithelial lining of the respiratory tract, Eustachian tube, thyroid and thymus.

12. The *cauda equina* is the lower part of the spinal cord, consisting of the roots of many nerves.

The *foramen of Winslow* is a foramen connecting the two sacs of the peritoneum; it is situated behind and below the transverse fissure of the liver.

The *optic thalamus* is one of the basal ganglia of the brain; it forms the side of the third ventricle and part of the floor of the lateral ventricles.

The *trigonum vesicæ* is a triangular surface at the base of the bladder, immediately behind the urethral orifice; it is bounded behind at each angle by the orifice of a ureter.

The *Eustachian tube* is an osteocartilaginous channel connecting the middle ear with the pharynx.

PHYSIOLOGY.

1. The *centers situated in the medulla oblongata* are those for: Respiration, salivary secretion, mastication, sucking, deglutition, speech production, facial expression; it also contains the cardiac and vasomotor centers.

2. The normal respiratory rate is about 18 per minute; the normal pulse rate is about 72 per minute. Hence the ratio between the respiration and pulse is about 1:4. The average measurement of the adult male chest is about 32 to 35 inches, in deep expiration, and about 34 to 38 inches in complete inspiration.

3. *Superficial reflexes.* 1. *Plantar;* elicited by stroking or scratching the sole of the foot, which causes attempts to withdraw the foot from the source of irritation. 2. *Gluteal;* a contraction of the gluteal muscles *en masse* when the buttock is gently pricked or scratched. 3. *Cremasteric;* when the thigh is irritated on its inner surface by grasping, stroking, scratching, etc., the homolateral testicle is distinctly retracted. 4. *Erectile reflex of penis;* produced by gentle friction of the glans penis, especially of the frenum, resulting in turgidity of the organ and erection. Its analogue in the female pertains to the erection of the clitoris. 5. *Abdominal;* consists of a retraction of the anterior abdominal walls when the skin is slightly irritated. 6. *Mammary;* in women, a retraction of the epigastrium when the mammary region is tickled. 7. *Palmar;* corresponding to the plantar, usually less developed than the latter."—(Hall's *Physiology.*)

4. "The *objects of climatic treatment* are to furnish a complete change of environment, to withdraw the patient from the influences under which he contracted the disease, to subject him to a climate which will promote healing in the lungs by increasing the activity of the digestive functions and thus stimulating nutrition, by improving the tone of the nervous and circulatory sys-

tems, either by invigoration or protection, and by lessening exposure to secondary infections. Further climatic treatment may have for its object palliation of distressing symptoms in patients whose diseases may not prove fatal for months.

The main *object of dietetic treatment* is to enable the patient to regain his lost weight but not to make him a "flabby, breathless mass of inert fat." A patient who eats and digests well is a patient half-cured. The teeth should receive careful attention and be placed in order at once. The preparation and serving of meals should receive the strictest attention, as the kitchen is the only pharmacy that many patients should know. The meals should be carefully chosen and each planned in relation to the preceding. The physician should carefully scrutinize the diet and lay down broad general rules. It is a wise plan to vary the articles of diet as much as possible, and special dishes on special days of the week should be avoided when possible. The table should be attractively arranged and the food well and quickly served (not quickly eaten). Many patients will eat well if the courses follow one another in rapid succession, whereas if long delays occur cough or fatigue may prevent the eating of the desired amount. To pile up a plate with large amounts and to expect a patient who, especially at first, has little or no desire for food to consume it is a mistake. Repeated helpings until the desired amount is eaten is preferable."—(Lawrason Brown, in Osler's *Modern Medicine*.)

5. *Heat is lost to the body* through the skin, the lungs, and in the urine and feces.

6. In the *stomach* the food is mixed with gastric juice, more thoroughly triturated, moved around the stomach, and finally expelled into the duodenum. In the stomach the proteins are split up into proteoses and peptones by the pepsin of the gastric juice, and certain bacteria are killed by the hydrochloric acid; starches are not affected; fats are split up by a gastric lipase.

7. Formerly the quantity of blood in the body was said to be about one-thirteenth of the body weight. Just now it is said to be about one-twentieth of the body weight. According to the former of these, an individual weighing 150 pounds would have about 11½ pounds of blood; on the latter basis he would have about 7½ pounds of blood.

8. The *chemical elements in the human body* are: Carbon, hydrogen, oxygen, nitrogen, chlorine, sodium, potassium, sulphur, calcium, iron, phosphorus, magnesium, fluorine, iodine, silicon.

9. The function of the secretions of the prostate and Cowper's glands is not understood. These secretions are essential to or aid in maintaining the motility of the spermatozoa; perhaps they render the seminal fluid more fluid and so aid in its ejaculation. According to Dearborn, "the secretion of the prostate seems to preserve the vitality of the spermatozoa, while that of Cowper's gland is a mucus which prevents their too wide dissipation in the vagina."

10. The blood on its passage through the kidneys loses water, salts, urea, carbon dioxide, and extractives.

11. *Functions of fat in the body.*—(1) It helps to maintain and regulate the body heat; (2) it acts as a protection to certain delicate structures; (3) it gives form and roundness to the body; (4) it acts as a reserve substance which the body can draw upon for nutrition in case of emergency; (5) it probably plays a part in the maintenance of the life and nutrition of the cells of the body.

12. To produce contraction of a muscle fiber a certain stimulus is necessary. A nerve impulse is generally the stimulus, but mechanical, chemical, electrical, and thermal stimuli will do as well. The time that elapses between the application of the stimulus and the contraction of the muscle is called the latent period. During contraction the following changes take place in a muscle: (1) It becomes shorter and thicker, but the volume remains the same; (2) it consumes oxygen; (3) it sets free carbon dioxide; (4) it forms sarcolactic acid; (5) it becomes acid in reaction; (6) it becomes more extensible and less elastic; (7) there is an increase in heat production, and consequently a rise of temperature; (8) the electrical reaction becomes relatively negative.

CHEMISTRY.

1. The *alkali metals* are sodium, potassium, lithium, rubidium, and cesium. They have a valence of one. Each of them makes a single chloride, a hydroxide, and one or more oxides. The hydroxides are more or less alkaline and are basic in character.

2. *Iodine* is a solid, occurring in bluish-gray crystalline scales; it has a metallic luster, is volatile, and has a peculiar odor: it is slightly soluble in water, but is very soluble in alcohol, ether, carbon disulphide, and benzene. It is a weak bleaching and oxidizing agent. Iodine is a disinfectant, parasiticide, irritant, and counterirritant.

3. *Amyl nitrite* is a liquid containing $C_5H_{11}NO_2$ and other nitrites.

4. *Test for lactic acid.*—Put three drops of concentrated solution of phenol and three drops of an aqueous solution of ferric chloride in a little water; to this add a little of the filtered gastric contents (after a test meal); if lactic acid is present the blue color turns to a canary-yellow.

5. *Proteins* are nitrogenous organic substances of complex composition and unknown constitution. They are found in every cell and tissue of the body, and are indispensable to the "life" of these cells and tissues. The chief proteins are: Albumins, globulins, nucleoalbumins, histons, protamins, albumoses, peptones, hemoglobins, nucleoproteids, glycoproteids, keratins, collagen. .

6. *Test for glucose.*—If albumin is present it should be removed. The urine is then tested for *sugar* as follows: Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

Test for uric acid.—To a few drops of the urine add a little dilute nitric acid and evaporate to dryness; a yellowish-red residue is left; add a little ammonia; a violet color results.

7. *Water of crystallization.*—Many substances, upon assuming the crystalline form, take with them a certain number of molecules of water which are necessary for the maintenance of the form (and often of the color) of the substance. This water is called *water of crystallization.*

A *deliquescent* substance is a solid which has such a tendency to unite with water that it absorbs it from the air, becoming damp and finally liquid.

Efflorescence is the property of certain crystalline bodies whereby, on exposure to air, they lose their water of crystallization and fall to powder.

8. Hydrogen sulphide may be prepared by the action of dilute sulphuric acid upon ferrous sulphide:

$$FeS + H_2SO_4 = FeSO_4 + H_2S.$$

Hydrogen sulphide is a colorless gas with a disgusting odor and taste (like rotten eggs); soluble in alcohol, slightly soluble in water; it is used as a reagent in the chemical laboratory.

9. An *alloy* is a substance composed of two or more metals.

An *amalgam* is an alloy containing mercury.

10. *Wood alcohol* is methyl alcohol, CH_3OH. It is a colorless liquid, with a sharp, burning taste and an alcoholic odor; it burns with a pale flame, giving less heat than that of ethyl alcohol; it is a good solvent for resins, sulphur, potash, and other substances. It is poisonous.

11. *Fatty acids* are monobasic acids, of the acetic series, with the general formula $C_nH_{2n}O_2$. Acetic acid, $CH_3.COOH$; valerianic acid, $C_4H_9.COOH$; palmitic acid, $C_{15}H_{31}.COOH$.

12. Saltpeter, KNO_3; Chile saltpeter, $NaNO_3$; blue vitriol, $CuSO_4$; green vitriol, $FeSO_4$.

HYGIENE AND SANITATION.

1. In case of communicable disease, the physician should isolate the patient and inform the local health authorities.

2. "In collecting rain from roofs, it is very necessary to insure cleanliness of the supply, by allowing the first flow to run to waste, thereby avoiding contamination by dirt, leaves, bird-droppings, soot, and other matters deposited upon the roof and collected in the gutters. A number of automatic devices are in use for the purpose of diverting the first washings away from the conductors. After this has been done, they change position, so that the subsequent fall is saved and stored. . . . Cisterns for storage of rain should be so constructed and arranged as to admit of easy inspection and cleaning. They should be kept covered so as to exclude dirt and dust of all kinds, insects, mice, and other animals, and to shut off light as well, for the presence of light is an important aid to the development of lower plant forms. The best materials for their construction are bricks, stone, cement, and slate. Cement makes a good lining if one is desired; mortar, however, is objectionable on account of the solvent power of water upon lime, which will cause progressive increase in hardness. Cisterns should be provided with overflow pipes discharging into the open air rather than into the house sewer, and their exits should be protected by wire netting against the entrance of leaves and small animals." (Harrington's *Hygiene*.)

3. "The *privy* must be at least six feet away from any dwelling, and fifty feet away from any well, spring, or stream; ready means of access must be provided for the scavenger, so that the contents need not be carried through a dwelling; the privy must be roofed to keep out the rain, and be provided with ventilating apertures

as near the top as possible; that part of the floor which is not under the seat must not be less than six inches above the level of the adjoining ground and moreover be flagged or paved with hard tiles having an inclination toward the door of the privy of one-half inch to the foot, so that liquids spilt upon it may run down outside and not find their way into the receptacle under the seat; the size or capacity of this receptacle may not exceed eight cubic feet, by which limitation a weekly removal of its contents is necessitated; the sides and floor of this receptacle must be of some impermeable material, the floor being at least three inches above the adjoining ground level; the seat of the privy should be hinged so as to allow of the ashes being readily thrown in, and the receptacle unconnected with any drain or sewer.—(Notter and Firth's *Hygiene.*)

4. The maximum period of incubation of *smallpox* is twenty days; of *scarlet fever* is twelve days; of *whooping cough* is ten days.

5. *Diseases which may be conveyed through cow's milk:* Tuberculosis, typhoid, scarlet fever, diphtheria, measles, foot and mouth disease, milk sickness, cholera, tonsillitis, and gastrointestinal disturbances.

6. *Theory of the application of vaccination against smallpox:* "The more recent view of the immunity conferred by vaccination against smallpox is based upon the demonstration that the disease variola in man and the disease vaccinia in the bovine species are of the same nature and not different, as was formerly believed. This has been established by numerous inoculation experiments. The disease in the cow is a modified form of the human disease. The effect of the passage of the unknown microorganisms through the insusceptible bovine is to diminish the virulence of the germ, that by its subsequent inoculation in man immunity is secured without the profound disturbance which infection with a germ of unmitigated virulence would involve."—(Delafield and Prudden's *Pathology.*)

7. *Five diseases that may be contracted by eating uncooked meat:* Trichinosis, tape worm, echinococcus disease, tuberculosis, anthrax.

8. Lead, zinc, mercury, arsenic, and antimony may produce occupational diseases.

9. It is impossible to answer this question. There is no method used; each State does as it pleases, and in some States there is no law on the subject.

10. *Vincent's angina* may be positively diagnosed by the finding of the fusiform bacillus and the spirocheta darticola in the membrane; it is most frequently confused with diphtheria.

11. The *Binet-Simon test* is employed to test the mentality of children and feebleminded persons.

12. Two most important factors in preventing the occurrence of bubonic plague are: (1) Complete destruction of rats and keeping them out of buildings; (2) persons exposed to infection should receive a prophylactic vaccination with Haffkine's vaccine.

SURGERY.

1. *Diabetic gangrene* "is prone to occur in persons over fifty years of age who suffer from diabetes mellitus. The vessels of these patients are often markedly atheromatous. In some cases the existence of the diabetes is unsuspected before the onset of the gangrene, and it is only on examining the urine that the cause of the condition is discovered. The gangrenous process seldom begins as suddenly as that associated with embolism, and, like senile gangrene, which it may closely simulate in its early stages, it not infrequently begins after a slight injury to one of the toes. It but rarely, however, assumes the dry, shrivelling type, as a rule being attended with swelling, edema, and dusky redness of the foot, and severe pain; the dead part remains warm longer than in other forms of senile gangrene; there is a greater tendency for patches of skin at some distance from the primary seat of disease to become gangrenous, and for the death of tissue to extend upward in the subcutaneous planes, leaving the overlying skin unaffected. The low vitality of the tissues favors the growth of bacteria, and if these gain access the gangrene assumes the characters of the moist type and spreads rapidly. There is usually a peculiarly offensive odor about the patient, which differs from that of other forms of moist gangrene." (Thomson and Miles' *Surgery*.)

2. *The early symptoms of hip-joint disease* are: Night cries (in a child); lameness in the morning; a slight limp; tendency to become tired on slight exertion; wasting; spasm; pain; swelling, and deformity (either real or apparent).

Treatment: In the early stages, rest in bed is indicated, with extension; also, tonics, restoratives, fresh air. If necessary, the limb should be straightened and put up in plaster of Paris, or a brace or other mechanical appliance should be used. Intraarticular injections of iodoform have been recommended. Resection of the hip may be necessary.

3. *Hemorrhage from the popliteal artery* may be controlled by: (1) Placing a pad in the popliteal space

and then keeping the leg in forced flexion by means of a bandage; (2) pressure on the femoral artery.

4. *Lumbar puncture:* "The back should be carefully sterilized and through asepsis must be preserved in every detail. The patient may lie on the right side with the left knee well drawn up, may lie prone with a pillow under the belly, or may sit in a chair with the body bent forward. The site of the intended puncture may be frozen with ethyl chloride, but no general anesthetic is required. A Pravaz syringe is employed. The needle, which should be three inches in length, is guarded by the surgeon's index-finger and the point is inserted one-half inch to the right of the median line and between the third and fourth lumbar vertebræ. It is pointed upward and a little inward under a spinous process. In a child the needle enters the canal at a depth of from two to three centimeters; in an adult, at a depth of from four to six centimeters. The fluid is permitted to fall drop after drop into a sterile test-tube." (DaCosta's *Surgery.*)

5. *Empyema.* "Treatment should be undertaken without delay. Aspiration seldom cures, but may be undertaken where the dyspnea is great, and an anesthetic given afterward for the excision of a piece of rib. Drainage is always necessary, and is best done by excising a portion of the fifth or sixth rib in the midaxillary line. The patient should be allowed to come round quickly from the anesthetic, so that the coughing which occurs will expel the masses of coagulated lymph and help to expand the lung. A big drainage tube is then inserted. Daily dressings are necessary, but irrigation of the cavity is seldom needed." (*Aids to Surgery.*)

6. *The treatment of epithelioma of the lower lip* consists in early and free removal of the affected portion of the lip and of the infected glands. In comparatively small growths which do not involve the angle of the mouth, a V-shaped incision is carried through the entire thickness of the lip so as to include the disease and an area of healthy tissue beyond it. In larger growths, particularly when situated at the angle of the mouth, it is necessary to carry an incision transversely into the cheek to enable the lip to be repaired without leaving deformity. When it is necessary to remove the greater part of the lower lip, the defect may be filled up by flaps of skin taken from below the jaw (Syme's operation). When the tumor is adherent to the lower jaw, it is necessary to resect a portion of that bone along with the lip. The frequency with which recurrence takes place in the lymphatic glands below the jaw renders it ad-

visable to remove these in all cases, whether they are palpably enlarged or not. J. Hutchinson, Jr., recommends that the submaxillary and submental triangles on both sides should be cleared out as a routine procedure." (Thomson and Miles' *Manual of Surgery.*)

7. *Acute infective osteomyelitis.* Causes: The general vitality is lowered, and there is some focus of ulceration in the mouth or throat, by which organisms enter and circulate in the blood. All that is now necessary is that some part of the bone should have its vitality depressed by a blow, strain, or exposure to cold, and the organisms then attack it. The bacteria most commonly found are the staphylococci, but streptococci are present occasionally. The disease usually begins in the new growing bone at the end of the diaphysis, rarely in the epiphysis. The lower ends of the femur and radius, the upper ends of the tibia and humerus, are the commonest seats.

"*Symptoms.*—The disease begins with a rigor, high temperature, and severe pain. The part becomes swollen, infiltrated, and congested, with distended veins over it. The pulse is rapid and small and the tongue dry, and delirium soon comes on. It should be distinguished from acute rheumatism by the fact that the interarticular and not the articular region is affected. Fluctuation can be detected if the bone be superficial, or the abscess may burst on the surface. The bone is then found to be bare over the extent of the abscess cavity. When the bone is deeply seated or the disease confined to the medulla, the swelling is later in evidence, but the pain and toxemia are very severe, and the patient may die from this before local signs show themselves. When the epiphysis is attacked, septic arthritis often quickly follows, and a loose flail joint may result.

"*Treatment* must be very prompt. A free incision must be made through the periosteum and the pus evacuated. In any case, whether pus is found or not, the surface of bone must be gouged away to expose the medulla freely, and any gangrenous tissue scraped out. The cavity must then be washed out and freely drained. The wound in the soft structures is not closed in any part. If symptoms of pyemia occur, it may be necessary to amputate the limb through the joint or bone above, so as to cut off the source of emboli. When a large portion of or the whole diaphysis is necrosed, there are two courses; either to cut short the disease by removing the dead portion at once, or to leave the sequestrum to stimulate the formation of an involucrum. Where there is a single bone, as in the arm and

thigh, the sequestrum is left; where there is a double set of bones, as in the forearm and leg, the sequestrum is removed at once. Celluloid, zinc, and ivory rods have been inserted to stimulate osteogenesis. In most cases it is doubtful how much bone is actually dead, so that it is better to open up the cloacæ in the newly formed involucrum to remove the sequestrum. The cavity heals by granulation." (*Aids to Surgery.*)

8. "*In impacted fractures* in the old, liable to break neck close to head, it is unwise to attempt forcible reduction to secure better position of the fragments. These cases should be handled as carefully as possible, and if there are no contraindications the patient should be placed upon a firm level mattress, the foot of the bed slightly elevated, and the leg immobilized either by sand bags placed on both sides or by the application of a long external T-splint. If there is muscular twitching, it is advisable to supplement this dressing by the application of a Buck traction apparatus with from three to six pounds fastened to the stirrup. This weight steadies the part and often gives considerable comfort. This dressing should be used for from four to eight weeks. It may be removed at this time and a short spica of plaster of Paris perhaps applied from the waist to mid-thigh, and the patient allowed upon crutches. In the aged it is better to remove all apparatus at the end of about five weeks and allow the patient to get up, at first sitting up a short time daily, later resting in a chair, and at the end of about ten weeks walking with crutches.

"Exception to the above rule in the treatment of impacted fractures is in cases occurring in early childhood or middle age, which, if left uncorrected, may result in a deforming coxa vara with considerable subsequent deformity and loss of function. In these cases it is advisable perhaps only after consultation with another surgeon to correct the deformity under ether, place the part in extreme abduction and traction, and while in this corrected position to apply a gypsum spica splint from chest to toes of the affected side after the method of Whitman." (Roberts and Kelly's *Fractures.*)

9. *Chronic appendicitis* may follow an acute attack, but "cases are sometimes met with in which the patient has never had an attack which would suggest acute appendicitis; he complains of impairment of his general health, of abdominal discomfort, sometimes amounting to pain, and inveterate constipation. There may be discomfort in the right side of the abdomen on bending the body or on lifting weights. In some cases the chief

complaint is of disturbance of digestion (appendicular dyspepsia). Physical examination is often inconclusive, as there may be no localized tenderness, and nothing can be made out on palpation of the right iliac fossa. The diagnosis is necessarily difficult, and may only be arrived at by a process of exclusion. In many cases it is only cleared up on opening the abdomen, when there is found a kink, stricture, concretion, or twist of the appendix, or adhesions in its neighborhood. Removal of the appendix and liberation of adhesions usually bring about a cure." (Thomson and Miles' *Surgery.*)

10. *Gunshot wound of the abdomen.* "The treatment, even without symptoms of visceral injury, is immediate enlargement of the wound, in order to explore the abdomen, check hemorrhage, and close such visceral perforations as may be found. The abdomen is then flushed with salt solution, and closed or drained, according to the amount of soiling present. If the omentum protrudes it should be ligated and removed, while coils of intestine should be carefully washed with salt solution and returned to the cavity. In cases in which there is doubt as to whether or not a wound enters the peritoneal cavity, such wound should be enlarged and the diagnosis positively made, preparation being made at the same time to treat any visceral injuries that may be found. In gunshot wounds on the battle field an exception has been made to the rule of immediate exploration, because it has been found that the chances of recovery are better without operation."—(Stewart's *Surgery.*)

11. The most common form of dislocation of the shoulder is the subcoracoid. *Kocher's method of reducing* is: To flex the forearm, press the elbow to the side, rotate the arm outward. Bring the arm forward and upward to a right angle with the body, then rotate inward, while the elbow is brought down over the body so that the fingers sweep the opposite shoulder.

12. "A *femoral hernia* protrudes through the crural canal, and presents through the saphenous opening. The coverings are: (1) Skin and subcutaneous tissue, (2) cribriform fascia, (3) anterior layer of the femoral sheath, (4) septum crurale and extraperitoneal fat.

The *Signs* are usually characteristic, viz., a more or less reducible swelling, with an impulse on coughing, and a neck which runs into the abdomen by way of the saphenous opening. From *inguinal hernia* it is distinguished by the neck being below Poupart's ligament and external to the pubic spine. A *psoas abscess* pointing through the saphenous opening is reducible, and has an impulse on coughing; but fluctuation can be

felt between the swelling at the saphenous opening and the swelling always present in the iliac fossa in these cases. A *pouch in a varicose saphenous vein* close to the saphenous opening has a characteristic thrill on coughing which should prevent mistakes." (*Aids to Surgery.*)

OBSTETRICS AND GYNECOLOGY.

1. *Postpartum hemorrhage.* Causes: Anything interfering with the firm contraction of the uterus after the expulsion of the child; retained placenta, or membrane, or clots; weakness of the uterine muscle; rapid labor; delayed labor; poorly developed uterine muscle; inflammation or disease of uterus; lacerations; imperfect separation of the placenta; mismanagement of the third stage of labor.

2. In the *third stage of labor* the physician should seize the fundus of the uterus through the abdominal wall and knead and rub it until it contracts vigorously; then he should press it down in the direction of the axis of the pelvic inlet. This should last for about a quarter of an hour after the child is born. The placenta, after it is expressed, should be carefully taken by the physician so as to be sure that it is *all* expelled; at the same time care must be taken that no particle of membrane remains behind. Fluid extract of ergot may be administered.

3. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment and may be near or over (partially or completely) the internal os. *Varieties:* (1) *Central,* when the placenta completely covers the os. (2) *Partial,* when the placenta overlaps the os. (3) *Marginal or lateral,* when the placenta reaches the margin of the os but does not overlap it. *Treatment at term:* (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the membranes, and if there is an unfavorable presentation, turn the child and make the breech engage in the os; or, if the head presents, the forceps may be used, if speedy delivery is necessary. Stop the hemorrhage by a tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version and immediate extraction of the child.

4. *Concealed hemorrhage* is one form of hemorrhage in premature detachment of the placenta. The blood dissects its way between the placenta and membranes, but does not escape externally (or only very slightly).

Cause: Separation at center of placenta, the edges still being adherent; detachment of placenta at upper margin only; plugging of parturient canal and thus hemorrhage from any cause cannot escape. *Symptoms* are pallor, syncope, thirst, rapid and weak pulse; the uterus is soft and enlarged.

5. The patient should be free from corsets and constricting bands; the bladder and rectum should be empty. *External palpation:* The patient should be in the lithotomy position, on a suitable table or bed. The examiner stands on one side, and palpates the lower abdomen to determine any enlargement of the uterus. *Inspection* will show the presence of parasites, discharges, caruncle, chancre, condylomata, and lacerations. *Vaginal touch:* The examiner separates the labia with the thumb and finger of one hand; and two fingers of the other hand well lubricated are introduced into the vagina. Pressure is made on the perineum until the posterior fornix is reached, when the palmar surfaces are turned forward and the size, position, and condition of the cervix are determined. Then with the palmar surface of the external hand gentle pressure is made on the abdomen and the two hands are approximated. A *digital vaginal examination* will show: (1) The condition of the perineum, whether torn or not; (2) the size, shape, dilatability, temperature, discharges (if any) of the vagina; (3) the presence of cystocele, rectocele, prolapsed uterus, or other abnormal conditions of vagina; (4) position, shape, size, consistence of cervix, with presence of absence of erosions, lacerations (5) condition, shape, size, location, and mobility of uterus; (6) sometimes presence of abnormalities in tubes, and ovaries, and uterus (such as tumors, inflammations, etc.) *Rectal examinations:* In virgins and in some cases of extreme retroversion one finger is introduced into the rectum and with the other hand on the abdomen a more satisfactory bi-manual examination can be made. *Instrumental examination:* in the lithotomy position, by the use of a bi-valve, a tubular or Ferguson speculum, the condition of the cervix can be inspected. This is best accomplished in some cases by use of the Sims position and the Sims speculum. At the same time in rare and selected cases by steadying the anterior lip of the cervix with a bullet forceps the uterine sound may be passed to determine the size and position of the uterus.

6. The recognized normal position of the uterus is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior

surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments.

7. *Separation of the placenta* from the uterine attachment is due to the retraction and contraction of the uterus which brings about a disproportion between the placenta and its site; the attachments between the two are torn through. In the intervals between the contractions a moderate hemorrhage takes place behind the placenta, and this is a factor in bringing about the separation.

8. *Erosion of the cervix* is a condition in which the vaginal portion of the cervix uteri has on its surface a mucous patch consisting of a layer of columnar epithelium and newly formed glands; these replace squamous stratified epithelium. The condition was formerly described as an ulcer but a true ulcer is characterized by loss of tissue, and there is no loss of tissue in an erosion. The *causes* are unknown; erosions are found in virgins, nulliparous, and parous women. *Treatment* consists in cleanliness, mild astringent douches, cauterization of the cervix, general improvement of the health and surroundings of the patient; in severe cases Emmett's operation, and amputation of the cervix have been recommended.

9. *Hygiene of puberty:* "The period of puberty should be taken as extending not only over the few months required for the establishment of menstruation, but as including the time necessary for full physical development. During this time the energy of the girl is taxed by the rapidity of sexual development, by the great liability to circulatory disturbances, by the physical and mental strain of education, and by the conventionalities of society. The necessity, therefore, for great care is apparent. Nutritious and simple diet, frequent rest, moderate amusements, and adequate exercise are essential, Study, especially during menstruation, should never be pressed to the point of fatigue. Inasmuch as passional life now begins, and the whole nervous organization is therefore subject to new impulses and requirements, books and associates should be selected carefully, and whatever may unduly excite the emotions should be excluded. Errors committed now may have grave consequences, such as malnutrition, psychoses, sterility, menstrual and other functional disorders, and may make the woman a hopeless invalid. One of the most serious errors is premature marriage." —(Dudley's *Gynecology.*)

10. *Accouchement forcé:* "By this term is understood the forcible dilatation of the intact or partially dilated cervix, followed by version and extraction of the child. *Indications:* In this country the most usual indication for *accouchement forcé* is threatened or actual eclampsia. Occasionally it becomes necessary in concealed or accidental hemorrhage, and also in the rare cases of acute edema of the lungs, or broken cardiac compensation complicating pregnancy, as well as in certain cases of placenta prævia."—(Williams' *Obstetrics.*)

11. *Uterine polypi* are pedunculated tumors attached to the uterine mucous membrane. *Mucous polypi* "grow most frequently from the cervix. According to some authorities they occur only as a result of inflammatory changes, being a mere local hypertrophy and hyperplasia. These polpi vary from a pea to a hen's egg in size. They are made up of the elements of the mucosa and are very vascular, usually of a cherry-red color. Often more than one are found. They are covered with columnar epithelium; when growing near the os externum, they may be partly or, sometimes, entirely covered with stratified squamous epithelium. They are made up of spaces lined with columnar or cubical epithelium, lying in a delicate connective tissue stroma, rich in capillaries; often blood is found diffused among the fibrils. In some cases, where the spaces are somewhat distended, the lining epithelium may be considerably flattened. They contain thick or thin mucus. As these polypi grow and descend they dilate the cervix. Sometimes those growing in the body do not tend to work their way down through the cervix. They sometimes tend to recur; in some cases there is a malignant tendency. Sometimes these growths may have a covering of stratified squamous epithelium, through growing from the cervical mucosa."—(Webster's *Diseases of Women.*)

12. VENEREAL WARTS. *Causes:* Gonorrhea, syphilis, irritating discharges, want of cleanliness, and (sometimes) the congestion and leucorrhea of pregnancy. *Treatment:* Excision of wart by curved scissors, followed by cauterization; application of calomel and salicylic acid; douches; cleanliness; tonics; and removal of the cause, if possible.

PATHOLOGY.

1. *Ophthalmia neonatorum* is an infectious, purulent inflammation of the conjunctiva in the newborn, due to the gonococcus or other pyogenic germ; produced by

contact of the eye with the vaginal secretion of the mother during labor, or infected fingers, or instruments, etc.

The treatment is (1) *Prophylactic.*—Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 or 2 per cent. solution of nitrate of silver, immediately after birth. (2) *Remedial.*—Wash the eyes carefully every half-hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of sliver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burned.

"The disease, if untreated, declines spontaneously, and the discharge almost ceases in about six weeks, the palpebral conjunctiva being left thick, relaxed, and more or less granular. Cicatricial changes identical with but less severe than those resulting from chronic granular lids, and analogous to those which occur in stricture of the urethra, sometimes follow; considerable permanent thickening of the ocular conjunctiva may also occur. There is a great risk to the cornea in this disease, partly from strangulation of the vessels, partly from the local influence of the discharge. If within the first two or three days the cornea becomes hazy and dull, like that of a dead fish, there is great risk that total or extensive sloughing will occur. In many of the milder cases ulcers form a little below the center and rapidly cause perforation. In other cases clear, deep ulcers form close to the edge of the cornea. There is less risk of ulceration of the cornea in the purulent ophthalmia of infants than in that of adults."—(Nettleship's *Diseases of the Eye.*)

2. The *cervix* is the most common site of malignancy of the uterus.

3. *To make a red blood count:* "The finger is cleansed and punctured. As soon as the blood is flowing freely a red-blood pipette is brought into contact with the drop, suction made, and the blood drawn up to the mark 0.5. In the case of an extremely anemic patient draw it up to the mark 1. If the mark is slightly over-reached, touch the point of the pipette against the towel till the column is brought back to the 0.5 mark. When the blood is drawn to the proper mark, and that on the outside of the tube wiped off (being careful not to touch the point), the pipette is immediately plunged into the

diluting solution and suction made as soon as it is below the surface. This is drawn up until the mark 101 is reached. The pipette, held in the horizontal position, is tapped rapidly with the fingers in order to mix thoroughly the blood. Next blow out the diluting fluid and place a medium-sized drop of the diluted blood upon the small glass cylinder in the counting-chamber. The next step is the careful adjustment of the cover-slip over the drop of diluted blood. The drop should now nearly cover the central glass slide; there should be no air bubbles in it; it should not overrun the gutter. If the slide be held up to the light on a level with the eyes, a play of colored rainbow rings may be seen. This indicates that the technique has been correct. A few minutes should elapse before counting to allow the corpuscles to settle. The counting-chamber is exactly one-tenth of a millimeter deep. The ruled square used for counting reds is a square millimeter divided into 400 small squares, so that each small square is 1/400 square millimeter. Use the low dry lens, with most of the light shut off. It is well to adopt the rule of beginning with the lower right square and counting upward. Every fifth square above and to the left is subdivided by an extra line to facilitate the counting. The corpuscles lying on the upper and left lines are counted; those on the lower and right are not. Continue this upward course till five squares are counted, then take the next square to the left and go down five, then the next to the left and go up again five squares, and so on till the number of corpuscles in 200 small squares is counted. This sum is divided by 200, thus giving the number in each small square. To calculate the number of corpuscles per cubic millimeter, multiply by 100, because the blood has been diluted 100 times; then by 400, because each small square is one four-hundredths of a square millimeter; then by 10, as the square millimeter is only one-tenth of a millimeter deep. This gives the number of corpuscles in a cubic millimeter. In short, with a dilution of 1:100 the number of corpuscles in each small square is multiplied by 400,000. If the dilution has been 1:200, multiply by 800,000." (Arneill's *Clinical Diagnosis.*)

4. *Pathology of erysipelas:* "Sections of the affected skin reveal an infiltration with granular leucocytes and serum, often including many micrococci, and involving the subcutaneous cellular tissue and to a variable depth the fat. The leucocytes are most numerous in the capillaries and lymph-spaces of the outer zone, where the disease is advancing; they are also numerous around

the hair follicles and sweat glands. Pus is formed in the worst cases. The edema is most pronounced in loose cellular tissue, as beneath the eyelids and the prepuce. Abscesses and infarction are occasionally found in the lungs, spleen, and kidneys." (French's *Practice of Medicine.*)

5. In *chronic parenchymatous nephritis:* "The quantity of urine is diminished, it is cloudy from urates; the specific gravity may be high in the early but is low in the later stages. Albumin is abundant, sometimes more so than in any other disease. The heavy sediment contains large numbers of nearly all the varieties of tube casts, hyaline, epithelial, granular, and fatty. The latter are especially characteristic. Occasional red corpuscles, many leucocytes, and numbers of degenerated epithelial cells are also found. The amount of urea is decreased." (Butler's *Diagnostics of Internal Medicine.*)

6. The *redness* is due to the hyperemia which is present in inflammation, the hyperemia being caused by the dilated vessels of the part.

The *swelling* is caused by the excess of blood present in the part, by the leucocytes brought to the part, by the exudate within the tissues, and by the newly-made tissue cells.

BACTERIOLOGY.

7. *To examine spinal fluid for meningocci:* The fluid should be received in a sterile container, and then centrifuged. The sediment is stained with Gram's stain; the diplococcus intracellularis meningitidis is a diplococcus, very small, with no capsule, non-motile, non-flagellate, Gram-negative, but staining by ordinary methods. A culture must be made very promptly; it grows at body temperature, on Loeffler's blood-serum mixture or glucose ascitic agar neutral to phenolphthalein. Transfers must be made frequently as the diplococcus is readily killed by heat, drying, sunlight, or disinfectants.

8. A sterile swab is rubbed over any visible membrane on the tonsils or throat and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered

for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appears as short thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts. *Methods of culture:* The bacillus of diphtheria grows upon all the ordinary culture media, and can be readily obtained in pure culture. Loeffler's blood serum, particularly with the addition of a little glucose, is an admirable medium for the rapid growth of this bacillus. The medium should be alkaline and not less than 20° C.

The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella, are nonmotile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue.

9. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue.

The chest fluid should be treated with antiformin, which kills most bacteria but not the tubercle bacilli; it is then centrifuged, and from the sediment the tubercle bacilli may be cultivated on blood serum. On account of the difficulty of obtaining material free from other bacteria (which grow more rapidly than the tubercle bacilli), it is often necessary to inoculate guinea pigs subcutaneously with the sediment, and then obtain cultures from these animals as soon as the tuberculous infection has developed.

10. A *typhoid carrier* is a person who is not suffering from the disease, but whose excreta contain the typhoid bacilli and who, therefore, is capable of giving the dis-

ease to others. The finding of the typhoid bacilli in the feces (and urine) of such a person is proof of his being a typhoid carrier.

11. *Immunity*, or the power to resist invasion by microorganisms with the subsequent development of disease, is *active* when the cells or tissues of the invaded individual bring about this immunity, either by destroying the bacteria or by neutralizing their poisonous products. Such an immunity may be acquired in several ways; one is by inoculation, another is by vaccination; this latter is used as a prophylactic measure against smallpox.

12. *The principle underlying Pasteur's treatment for rabies:* "It consists of an active immunization with virus, attenuated by drying, administered during the long incubation period in doses of progressively increased virulence. By the repeated passage of street virus through rabbits, Pasteur obtained a virus of maximum and approximately constant virulence which he designated as *virus fixé*. He then ascertained that such *virus fixé* could be gradually attenuated by drying over caustic potash at a temperature of about 25° C., the degree of attenuation varying directly with the time of drying. Thus, while fresh *virus fixé* regularly caused death in rabbits after six to seven days, the incubation time following the inoculation of dried virus grew longer and longer as the time of drying was increased, until finally virus dried for eight days was no longer regularly infectious and that dried for twelve to fourteen days had completely lost its virulence. The method of active immunization which Pasteur used consisted in injecting, subcutaneously, virus of progressively increasing virulence, beginning with that derived from cords dried for thirteen days and gradually advancing to a strong virus. Thus the patient was immunized to a potent virus several weeks before the incubation time of his own infection had elapsed." (Hiss and Zinsser's *Bacteriology*.)

DIAGNOSIS.

1. *Symptoms of intracranial hemorrhage (apoplexy):* There may be prodromal symptoms such as vertigo, pain in the head, or impairment of memory; but as a rule the attack is sudden with vertigo and unconsciousness; there may be retention or incontinence of urine, the urine has a high specific gravity and may contain albumin; hemiplegia generally ensues; the tongue protrudes toward the affected side; asphasia (either motor or sensory) may be present; the face is flushed, breath-

ing is stertorous; the body temperature is first subnormal and then elevated; the pulse is slow and full; in severe cases the pulse becomes weak, and the respirations become of the Cheyne-Stokes type; the reflexes are abolished.

2. *Apthous ulcers* are sharply defined, extremely sensitive, and evanescent in character.

Mucous patches are rounded or oval, flat, slightly elevated or depressed, grayish or pinkish in color, and slightly painful.

3. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist rales at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

4. In *aortic stenosis*, there is a systolic murmur heard loudest at the base of the heart, and transmitted into the carotid arteries; the pulse is characteristic, being small and slow. In *mitral insufficiency*, there is a systolic murmur heard loudest near the apex and transmitted to the left axilla and sometimes to the angle of the left scapula; there is frequently an accentuated second pulmonic sound; the pulse shows nothing that is characteristic.

5. The renal conditions resulting from arteriosclerosis are those found in chronic interstitial nephritis. The symptoms are: Increased arterial tension, enlargement of the left ventricle and then of entire heart, accentuated second aortic sound, retinitis, choked disc, anorexia, nausea, vomiting, diarrhea, uremia, dyspnea, dry and itching skin; the urine is increased in quantity, and has a low specific gravity, albumin is either absent or present in very small quantity; a few hyaline casts may be present.

6. *Alcoholic cirrhosis of the liver.* "Obstruction of the portal circulation first causes congestion and catarrh of the stomach, hence the initial symptoms are anorexia, fetor of the breath, fullness and distress after eating, eructations, nausea, vomiting of mucus, flatulence, and constipation. For months, and even years, these phenomena may be the only evidence of the disease. As the pressure in the portal system increases, the collateral vessels enlarge, and as a result the superficial abdominal veins become prominent and hemorrhoids develop. Engorgement of the portal system also leads to ascites and swelling of the feet, to

enlargement of the spleen, and not infrequently to copious hemorrhages from the stomach or bowel. The size of the liver varies; it may be increased or diminished. There is a gradual loss of flesh and strength. The skin is muddy in appearance, but conspicuous jaundice is not common and occurs only as a complication, nervous symptoms—delirium, stupor, convulsions, and coma—occasionally appear toward the end of the disease. They are probably due to the retention of poisons that the liver is unable to convert or to eliminate. The majority of cases terminate fatally in from three to five years, or in from one to two years after the compensatory circulation fails. Death results from exhaustion, hemorrhage, pulmonary edema. intercurrent disease, or toxemia."—(Stevens' *Practice of Medicine.*)

7. *Deflections of the nasal septum* may cause: Obstruction to inspiration; catarrh of the nasopharynx; hypertrophy of middle or inferior turbinated bone on the non-obstructed side; atrophy of turbinated bone on the obstructed side; interference with hearing; mouth-breathing.

8. The *leucocytes are increased* in: Inflammatory diseases, abscesses, certain infectious diseases (such as erysipelas, pneumonia, meningitis, diphtheria), lymphatic leukemia, splenomedullary leukemia.

Leucopenia is found in: Pernicious anemia, typhoid, and miliary tuberculosis.

9. *Intestinal perforation in typhoid fever:* Sometimes there is severe, sudden pain localized in the abdomen, and sometimes there is little or no pain. Marked tympanites, great weakness, collapse, anxious look, small, rapid pulse, and difficult breathing are present. The legs are apt to be drawn up, and nausea and vomiting may ensue. Hepatic and splenic dulness disappear, and leucocytosis may be present.

10. *Symptoms of myxedema:* The body becomes swollen and edematous, but does not pit on pressure; the skin is dry and rough; the hair is brittle, and tends to fall out; wrinkles are obliterated, and the face assumes a stolid expression; the muscles become flabby; movement, mental processes, and speech become slow; the temperature of the body is subnormal.

The condition is significant of lack of thyroid secretion.

11. *Wrist-drop is an important symptom* in: Paralysis of the musculo-spiral nerve due to lead poisoning or multiple neuritis.

12. *Physical signs of lobar pneumonia:* "Inspection reveals during the first stage deficient movement of the

affected side, due to pain. The apex-beat is normal in situation, and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air, the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration). *Palpation* during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage, the vocal fremitus is markedly exaggerated, except in those rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position. *Percussion*—In the first stage, the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas the resonance is increased (Skoda's resonance). *Auscultation.*—In the first stage there is heard over the affected part a feeble vesicular murmur, associated with the true vesicular or crepitant (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds, may be heard. In the third stage, the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redux) returns. As resolution proceeds, the breath sounds are associated with large and small moist and bubbling râles."—(Hughes' *Practice of Medicine.*)

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF THE STATE OF NORTH CAROLINA.

ANATOMY, PATHOLOGY, HISTOLOGY, AND BACTERIOLOGY.

1. Locate and describe the cecum.
2. Give origin, course, and distribution of the seventh nerve.
3. Describe the right and left subclavian veins.
4. Describe the diaphragm, its principal openings and nerve supply.

5. Describe the mastoid portion of the temporal bone, and name the muscles attached thereto.
6. Name the ligaments of the hip-joint.
7. Relate the difference between a virgin uterus and the uterus of a multipara.
8. What anatomic parts are involved in the descent of the testes.
9. Describe the lesion found in the different forms of cirrhosis of the liver.
10. Give the gross pathology of amebic dysentery. Describe the organism giving rise to it and name the pathological condition of the liver often associated with it.

Answer only 8 questions.

PHYSIOLOGY AND HYGIENE.

1. What do you consider the chief difference in the function of epithelial and connective tissue?
2. Name classes of foods. (*a*) Which of these is alone capable of sustaining life? (*b*) What chemical element is usually spoken of as the chief characteristic of this one? (*c*) What per cent. of the molecule is composed of this element? (*d*) In the form of what substance is this element chiefly eliminated? (*e*) Where is this substance formed?
3. Name enzymes found in alimentary canal, place found, and function.
4. Give classification of white blood corpuscles and per cent. of each found in normal blood.
5. What is the fluid in muscle tissue called? (*a*) What is its chemical reaction? (*b*) How is this affected by fatigue? (*c*) By death? (*d*) Explain.
6. Trace circulation of blood through kidney.
7. Define Wallerian degeneration.
8. Give distribution of pneumogastric nerve and function in each locality. (That is state class of nerve in each locality.)
9. What is the significance of colon bacilli in drinking water?

MATERIA MEDICA AND THERAPEUTICS.

1. Mention the conditions which affect the dosage of medicines. Name the methods of introducing medicines into the circulation.
2. Give the physiological action of saline purgatives and their therapeutic uses.
3. Name the three most used preparations of opium and state how much of each represents one grain of opium. Explain the constipating action of opium.
4. Name an antidote for each of the following, and

state whether this is physiological or chemical: arsenic, opium, copper, and strychnine.

5. State what remedies are used to reduce temperature. Explain how they accomplish this result, and describe how used.

6. What drugs would you use to stimulate the heart's action, to produce emesis, to control hemorrhage, to produce sleep, to relieve pain? Doses of each.

7. Name several drugs that render urine alkaline. Give their doses. What class of acids would you use to acidify alkaline urine? Give an example. Give the composition of linimentum calcis and therapeutic uses.

8. What is incompatibility in medicine, and what are the different kinds of incompatibles? Give an example of each.

CHEMISTRY AND DISEASES OF CHILDREN.

1. Describe the process of manufacture of chloroform, ether, and nitrous oxide, and express in equations the reactions respectively occurring in their formation.

2. Review briefly the theory of ions or of electrolytic dissociation.

3. The composition of normal urine represents the approximate equilibrium between the *acidic* and the *basic* end-products of metabolism. Name several food substances which contribute to the establishment of *acid conditions*, and several others which contribute, in like degree, to the establishment of *basic conditions*.

4. What two sugars are especially concerned in the anabolism of the tissues? What organ converts levulose and lactose into glucose? How would you determine the limit of assimilation of the various sugars?

5. What are fats chemically? In what two ways do fats form in the organism? How is the composition of the fats of the diet affected in the process of digestion and assimilation? What is the significance of excessive unresolved fat and of fatty acid crystals in the feces? What is the final fate of the fat in the body?

6. State the general plan of the enzymotic hydrolysis of the protein molecule, and designate the form which the resulting products must assume prior to absorption and nutrification.

7. Discuss the properties, the relative merits, and the indications for using the various carbohydrates in infant feeding.

8. Describe Kernig's and Babinski's reflexes, and give their respective diagnostic value.

9. Describe congenital atelectasis, and state the best method of remedying the condition.

Answer any six of the foregoing questions.

NORTH CAROLINA.

PRACTICE OF MEDICINE.

1. What is aphasia? (*a*) What is the difference between sensory and motor aphasia? (*b*) Where is the central lesion in motor aphasia located?

2. What is multiple neuritis? (*a*) Give etiology, diagnosis, and prognosis.

3. What is diabetes? (*a*) What are the modern theories concerning its etiology? (*b*) Discuss the carbohydrates in the treatment.

4. Describe briefly the character and situation of pain in gastralgia, ulcer of the stomach, lead colic, general peritonitis, appendicitis, gallstone colic, and kidney colic.

5. What are the chief causes of secondary anemia? (*a*) How would you differentiate secondary anemia from primary pernicious anemia?

6. Define aneurysms. How may they be classified? (*a*) How would you differentiate between aneurysm of the ascending and transverse aorta?

7. What are the chief causes for obstruction of the common bile duct producing jaundice? (*a*) Give the clinical manifestations produced by obliteration at Vater's ampulla.

8. Define pellagra. (*a*) Give the clinical history. (*b*) Give the most recent treatment, and the mode of administration.

GYNECOLOGY AND OBSTETRICS.

1. Source, composition, and specific gravity of liquor amnii.

2. Discuss briefly the physiology of the transmission of insanity, feeble-mindedness, or other mental or moral traits or characteristics, or physical defects, or characteristics from parent to offspring. Give Mendel's formula for heredity.

3. What constitutes the pelvic floor?

4. What are some of the indications for producing sterility in a woman and describe the proper operation.

5. Differentiate uterine polypus and chronic inversion of the uterus, and give proper treatment in each case?

6. (*a*) What is the normal course of delivery in occipito-posterior position? (*b*) In case the normal course is not followed, what is the method of delivery? (*c*) And in the latter case what is the percentage of mortality to mother and child?

7. (*a*) What are some of the diseases of the breast liable to occur during the puerperium? (*b*) What is the treatment for each? (*c*) What prophylactic measures should be instituted?

8. (*a*) State some of the indications, and (*b*) describe what you consider the best operation for emptying the

uterus at the second month of uterogestation, (*c*) at the sixth month.

Answer only six questions.

SURGERY.

1. Name every disease or condition (occurring to you), involving the genitourinary tract, which might produce hematuria.

2. Describe the operative technique of a resection of the elbow joint, naming the important structures to avoid.

3. Name: (*a*) The varieties of dislocation of the shoulder joint. (*b*) Diagnostic symptoms of a subcoracoid. (*c*) Technique of reduction of a subcoracoid.

4. Give the surgical guides for the location of the lingual artery, for the purpose of ligation.

5. How would you treat a compound fracture of the tibia at its middle third?

6. Give symptoms and treatment of an osteomyelitis of the tibia.

7. Define (*a*) chancroid, or soft chancre. (*b*) How would you treat a chancroid or soft chancre of the penis? (*c*) What is its incubation period?

8. Describe the operative technique, of a tracheotomy.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF THE STATE OF NORTH CAROLINA.

ANATOMY, PATHOLOGY, HISTOLOGY, AND BACTERIOLOGY.

1. The *cecum* is a blind pouch which forms the commencement of the large intestine. It is situated in the right iliac fossa, immediately behind the abdominal wall, and above the outer half of Poupart's ligament. It may lie on or to the right side of the psoas muscle, or in the pelvis; and is of very variable size. Its length may be from two to four inches, and its width about the same. It is generally covered by peritoneum, and is usually freely movable. Its shape is variable, and it is generally classified under one of four possible types. From the cecum is given of the vermiform appendix. The ileocecal valve opens into the large intestine at the point of junction of the cecum with the ascending colon.

2. The *seventh or facial nerve* has its superficial origin in the upper end of the medulla oblongata, in the groove between the olivary and restiform bodies. It

passes "forward and outward to enter the internal auditory meatus; it lies upon a groove on the auditory nerve, with portio intermedia of Wrisberg between, and at the bottom of the meatus it enters the aqueductus Fallopii, along which it runs first outward between cochlea and vestibule as far as hiatus Fallopii; then backward in internal wall of tympanum, just above fenestra ovalis, at the turn presenting a swelling, the geniculate ganglion; and finally it passes downward, to emerge from the bone at the stylomastoid foramen; it then passes outward and forward in the parotid, dividing behind the ramus of the jaw into temporo-facial and cervico-facial branches, which further subdivide and intercommunicate, forming the pes anserinus."—(*Aids to Anatomy.*)

It *supplies* the muscles of expression in the face, the muscles of the external ear, the Platysma, Buccinator, Stylohyoid, and the posterior belly of the Digastric.

3. The *subclavian vein* is the continuation of the axillary, and extends from the outer border of the first rib to the inner end of the clavicle where it joins the internal jugular vein, the two forming the innominate vein. At this junction the left subclavian vein receives the thoracic duct and the right subclavian vein receives the right lymphatic duct. The tributaries are the external, and anterior jugular veins. It is separated from the subclavian artery by the scalenus anticus muscle and the phrenic nerve.

4. The *diaphragm* is a musculofibrous septum which divides the thoracic from the abdominal cavity; it is fan-shaped; the broad elliptical portion is horizontal, and the crura are vertical. It is attached to the ensiform, to the internal surfaces of the lower six costal cartilages, to bodies and intervertebral substances of first, second, and third lumbar vertebræ. Its *openings* are: (1) The aortic, transmitting the aorta, vena azygos major, and the thoracic duct; (2) the esophageal, transmitting the esophagus, pneumogastric nerves, and some small esophageal arteries; (3) the opening for the vena cava, transmitting the inferior vena cava, and small branches of the right phrenic nerve; (4) the right crural, transmitting the right splanchnic nerves; (5) the left crural, transmitting the left splanchnic nerves and the vena azygos minor. —*Nerve Supply*: Phrenic, lower intercostals, and sympathetic.

5. The *mastoid portion of the temporal bone* is situated at the posterior part of the bone; its outer surface is rough and has several foramina, the chief of

which is called the mastoid foramen and transmits a vein to the lateral sinus and a small artery to the dura. It is continued below into the mastoid process, on the inner side of which is the digastric fossa. The inner surface lodges part of the lateral sinus in the sigmoid fossa. The mastoid process contains the mastoid antrum and the mastoid cells. *Muscles attached*: Occipito-frontalis, sterno-mastoid, trachelo-mastoid, retrahens aurem, splenius capitis, and digastric.

6. The *ligaments of the hip-joint*, are: Capsular, iliofemoral, cotyloid, transverse, and ligamentum teres.

7.

VIRGIN UTERUS	UTERUS OF MULTIPARA
The cavity is of normal length and triangular.	The cavity is increased in length, and oval.
The cervix is small, hard, and cartilaginous, and of the same length as the body.	The cervix is large and soft; it is about one-half the length of the body.
The external os is a transverse slit or pinhole orifice with smooth edges.	The external os is irregular and its edges are fissured.
The sides of the cavity of the body are convex inward.	The sides of the cavity of the body are convex outward.
The uterus is normally anteflexed.	The uterus is straighter, or even retrodisplaced.
There is more or less flattening of the anterior and posterior uterine surfaces.	The contour of the uterus is more rounded, while its diameters are increased.
The fundus is nearly flat.	The fundus is convex.
The internal os is closed.	The internal os is patulous.

(From Dorland's *Obstetrics*.)

8. *Descent of the Testes*.—"In early fetal life the testes are placed at the back part of the abdomen, below and in front of the kidneys, and behind the peritoneum. About the third month a peculiar structure, the gubernaculum testis, appears, attached to the lower end of the epididymis, and extending as a cord to the bottom of the scrotum. It is supposed to cause the descent of the testicle. It reaches its full development between the fifth and sixth month, at which time the testicle reaches the iliac fossa. It enters the internal abdominal ring by the seventh month, and the scrotum by the eighth month, carrying

before it a fold of peritoneum, which is afterward shut off, forming the tunica vaginalis testis. Other coverings of the testicle are also derived in this manner. In the female a structure similar to the gubernaculum forms the round ligament." (Young's *Handbook of Anatomy.*)

9. The following table (from Thayer's "Pathology") will assist in distinguishing the two varieties of cirrhosis of the liver:

Synonyms. Charcot's, Hypertrophic, Unilobular, Hepatogenous, Biliary.	Laennec's, Atrophic, Multilobular, Hematogenous, Hob-nail liver.
Jaundice. Early and marked, bile often absent from feces.	Late and slight, bile usually present.
Ascites. Late and unimportant.	May be early; often enormous.
Spleen. Enlarged early and markedly.	Late and less.
Alimentary hemorrhage, piles. Not common.	Common.
Liver. Large, smooth, mottled, green.	Small, rough, pale or yellow.
New fibrous tissue. In fine lines and strands between acini and cells, involving all parts equally.	In broad bands, making prominent islands in which the single acinus may appear nearly normal; distributed irregularly.

10. In *amebic dysentery:* "The lesions are chiefly seated in the intestine. They present: (*a*) Small gelatinous swellings of the mucosa, with partial ulceration; (*b*) Necrosis and sloughing of the underlying tissues. The ulcers of amebic dysentery thus have undermined edges. The amebæ are found in the ulcerating mucosa, but more abundantly in the tissues beyond the ulcerated area (submucous or muscular coat), where they set up edema and necrosis. Later, along with the ulcers, cicatrices, leading sometimes to partial stricture, may be found. Hepatic abscess, usually single, and hepatopulmonary abscess are common complications. Amebæ are sometimes found in the portal capillaries.

"The ameba is a rounded cell with a clear outer ectoplasm, and a granular endoplasm. It has a rounded or oval eccentric nucleus, and measures from 10 to 15 μ in diameter. In the warm stage it shows active ameboid movement. In the resting stage it forms a cyst.

or cysts, and in this state resists drying for a long time. The organisms are found chiefly in the large intestine, especially in the rectum and flexures, but they also occur in the ileum and stomach, and in the liver. They have the power of penetrating the tissues."—(Wheeler and Jack's *Handbook of Medicine.*)

PHYSIOLOGY AND HYGIENE.

1. The *functions of epithelium* are: Protection, secretion, absorption, special sensation, and ciliary motion.

The *functions of connective tissues* are: Support, connection, and protection.

2. Foods are classified as follows:

- Inorganic
  - Salts
  - Water
- Organic
  - Nitrogenous—Proteins
  - Non-nitrogenous
    - Carbohydrates
    - Fats

(*a*) Proteins.
(*b*) Nitrogen.
(*c*) About 15 to 18 per cent.
(*d*) Urea.
(*e*) In the liver.

3.

ENZYMES.	ORIGIN.	FUNCTIONS.
Ptyalin.	Saliva.	Changes starches into dextrin and sugar.
Pepsin.	Gastric juice.	Changes proteids into proteoses and peptones in an acid medium.
A curdling ferment.	Gastric juice.	Curdles the casein of milk.
Trypsin.	Pancreatic juice.	Changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin in an alkaline medium.

ENZYMES.	ORIGIN.	FUNCTIONS.
Amylopsin.	Pancreatic juice.	Converts starches into maltose.
Steapsin.	Pancreatic juice.	Emulsifies and saponifies fats.
A curdling ferment.	Pancreatic juice.	Curdles the casein of milk.
Invertin.	Succus entericus.	Converts maltose into glucose.

4. *White blood corpuscles are classified* as follows: (*a*) Small mononuclear leucocytes or lymphocytes, about 25 per cent. of the white blood corpuscles; (*b*) large mononuclear leucocytes, about 1 per cent.; (*c*) transitionals, about 2 to 4 per cent.; (*d*) polynuclears, about 70 per cent.; (*e*) eosinophiles, about 2 per cent.; (*f*) and mast-cells, about 0.1 to 0.5 per cent.

5. The fluid in muscle tissue is called muscle-plasma.
(*a*) Alkaline.
(*b*) Acid, due to development of sarcolactic acid.
(*c*) Acid, due to development of sarcolactic acid.

6. *Renal circulation.* "The renal artery, on entering the kidney, breaks up into numerous primary branches, which travel along the columns of Bertini, and are called the arteriæ propriæ renales. These divide at the base of the pyramids and form arches with their neighbors; these arches give off (1) branches into the cortex termed the interlobular arteries, from which the afferent vessels to the Malpighian tuft arise; the efferent vein from the glomerulus breaks up into a capillary network which ramifies on the urinary tubules in the cortex, and after an extended course joins the interlobular veins; the efferent vessels of the lowermost glomeruli break up into and surround the straight tubules; (2) branches downward into the pyramids running between the bundles of collecting tubes, and termed the vasa recta or arteriæ rectæ. The interlobular veins correspond with the arteries, and receive some veins termed stellate from beneath the capsule, and also the small veins which receive the blood from the minute plexus surrounding the convoluted tubes. The venæ rectæ run along the pyramids accompanying the corresponding arteries. The venæ propriæ renales pass along the columns of Bertini after having been joined by the interlobular veins and venæ rectæ."—(Ashby's *Notes on Physiology.*)

7. *Wallerian degeneration:* "When a nerve is divided the first result is a loss of its function. Inasmuch as

each nerve-fiber develops from a cell which later nourishes it, if the connection between the two is severed the nerve-fiber undergoes Wallerian degeneration, and in the case of a nerve which is made up of nerve-fibers the whole nerve undergoes this change. This degeneration consists, in the case of medullated nerves, in the death of the axis-cylinder, the breaking up of the medullary sheath into drops of myelin, which are later absorbed, and the multiplication of the nuclei of the primitive sheath. In non-medullated nerves the only result is the death of the axis-cylinder. Degeneration begins very soon after the section—within a day or two—and throughout the entire severed portion of the nerve at the same time. Thus the course of a nerve, or a collection of nerves, may be traced throughout its entire extent. These changes are believed to be due to the severance of the nerve from its trophic center. If an anterior root of a spinal nerve is divided, the distal end, being separated from the gray matter of the cord which is its center of nutrition, undergoes degeneration, while the end which remains connected with the cord retains its integrity. If a posterior root is divided between the cord and the ganglion, the degeneration takes place between the cord and the ganglion; while if divided below the ganglion, the degeneration takes place in that portion separated from the ganglion, showing that the ganglion is the nutritive center for the posterior root." (Raymond's *Physiology.*)

8. *Distribution of pneumogastric nerve:* To dura, external ear, pharynx, heart, lungs, esophagus, and stomach. *Functions:* "Throughout its whole course the pneumogastric contains both sensory and motor fibers. To summarize the many functions of this nerve * * * it may be said that it supplies (1) *motor* influence to the pharynx and esophagus, stomach, and intestines, to the larynx, trachea, bronchi, and lungs; (2) *sensory* and, in part, (3) *vasomotor* influence, to the same regions; (4) *inhibitory* influence to the *heart;* (5) *inhibitory* afferent impulses to the *vasomotor center;* (6) *excitosecretory* to the salivary glands; (7) *excitomotor* in coughing, vomiting, etc." (Kirkes' *Physiology.*)

9. The presence of colon bacilli in drinking water is an indication that the water is polluted with sewage.

MATERIA MEDICA AND THERAPEUTICS.

1. *Conditions which affect the dosage of medicines:* Age, sex, weight, habit, idiosyncrasy, method of administration, mental emotion, preparation of the drug, cu-

mulative action of the drug, and the presence of disease.

Methods of introducing medicine into the circulation: By mouth or stomach, hypodermatically, by inhalation, by the rectum, by inunction, by fumigation, intravenously, and intramuscularly.

2. *Salines* stimulate the intestinal glands to increased secretion, and by their low diffusibility impede reabsorption; this results in an accumulation of fluid in the intestinal tract, which partly from the effect of gravity and partly by stimulating peristalsis, causes a copious evacuation.

Salines are indicated in constipation, intestinal putrefaction, dropsy and to lessen the secretion of milk in nursing mothers.

3. Tincture of opium, 10 minims equals one grain of opium; camphorated tincture of opium, about half an ounce contains one grain of opium; Dover's powder, 10 grains contains one grain of opium.

4. *Antidote* for *arsenic,* freshly prepared solution of ferric hydroxide (chemical); for *opium,* potassium permanganate (chemical); for *copper,* potassium ferrocyanide (chemical); for *strychnine,* potassium permanganate (chemical).

5. The following table (from Potter's "Materia Medica") gives the chief antipyretics with their manner of action. Temperature depression may be done by five different actions working upon two principal lines, viz., by:

(*a*) *Lessening heat production, by*
- (1) diminishing tissue change,
- (2) reducing the circulation.

(*b*) *Promoting heat loss, by*
- (3) dilating cutaneous vessels, thus increasing heat radiation.
- (4) promoting perspiration — its evaporation lowering the temperature.
- (5) abstracting heat from the body.

The following list of antipyretics include a few for each of the above-named actions, to which the numbers refer in each case, viz.:

Quinine, 1.	Aconite, 2.	Antipyrin, 1, 4.
Phenol, 1.	Alcohol, 1, 3.	Antimony, 2, 4.
Salicin, 1.	Nitrous ether, 3, 4.	Cold Bath, 5.
Digitalis, 2.	Acetanilid, 1, 4.	Cold drinks, 5.
	Phenacetin, 1, 4.	Wet-pack, 5.

6. *To stimulate the heart's action:* Alcohol ℥ss; aromatic spirit of ammonia, ʒj; nitroglycerin, gr. 1/20; ether, ʒj; heat, applied over the heart; digitalis, extr. gr. j; citrated caffeine, gr. v; tincture of strophanthus, ♏v; strychnine sulphate, gr. 1/20.

To produce emesis: Ipecac, gr. xx; apomorphine hydrochloride, gr. 1/10; tartar emetic, gr. ½; zinc sulphate, gr. xv; copper sulphate, gr. iv; mustard and water.

To control hemorrhage: Wine of ergot, ʒij; adrenalin chloride, ♏v of the solution; fluid extract of hamamelis, ♏xxx.

To produce sleep: Opium, gr. ss; tincture of Cannabis indica, ♏x; alcohol, ℥j; chloral hydrate, gr. xv; sulphonal, gr. xv; trional, gr. xv; veronal, gr. vij.

To relieve pain: Opium, gr. jss to ij.

7. The salts of potassium, lithium, and sodium render the urine alkaline. Lithium bromide, gr. xv; lithium citrate, gr. vij; potassium acetate, gr. xxx; potassium bicarbonate, gr. xxx; potassium citrate, gr. xv; potassium bitartrate, gr. xxx; potassium and sodium tartrate, ʒij; sodium acetate, gr. xv; sodium bicarbonate, gr. xv; sodium, gr. xv.

To acidify the urine: Vegetable acids, in excess, acid sodium phosphate, or benzoic or salicylic acids.

Linimentum Calcis contains equal parts of lime water and linseed oil. It is used locally for burns.

8. *Incompatibility* is that relation between medicines which renders their admixture unsuitable. Incompatibility may be chemical, pharmaceutical, or therapeutic. *Chemical incompatibility* is seen in compounding an acid with a base, and forming a salt. *Pharmaceutical incompatibility* is seen in compounding a resinous tincture with an aqueous solution. *Therapeutic incompatibility* is seen when two agents are administered together which have an opposite action, such as belladonna and physostigma.

CHEMISTRY AND DISEASES OF CHILDREN.

1. *Chloroform* can be obtained by heating chloral hydrate with an alkali:

$$C_2HCl_3(OH)_2 + KHO = CHCl_3 + H.COOK + H_2O$$

Ether is made by the action of sulphuric acid on alcohol:

$$H_2SO_4 + C_2H_5OH = H_2O + C_2H_5HSO_4$$
$$C_2H_5HSO_4 + C_2H_5OH = H_2SO_4 + (C_2H_5)_2O$$

Nitrous oxide is made by heating ammonium nitrate:

$$NH_4NO_3 = N_2O + 2H_2O$$

2. *Electrolysis and Electrical Dissociation.*—"The molecules of many simple chemical substances, on be-

ing dissolved in water, are more or less completely split up or dissociated into two or more (generally two) parts called ions. This behavior of substances, on going into solution, is known as electrolytic dissociation or ionization. The substances which dissociate in this manner are all conductors of electricity, and are called electrolytes; those substances which do not dissociate are non-conductors. When a current of electricity passes through an electrolyte or its solution, the latter undergoes certain changes, which we group under the term electrolysis. The electrodes are the conductors by which the current enters or leaves the electrolyte. Under the influence of an electrical current the ions of the electrolyte migrate in two directions. Those ions which migrate toward and concentrate about the anode (or positive electrode) are called anions. Those which migrate toward and accumulate about the cathode (or negative electrode) are called cathions. Certain gases undergo ionization under the action of the ultraviolet light, Röntgen rays, radium rays or heat."—(Bartley's *Medical Chemistry*).

3. *Acid conditions* of the urine are caused by animal food, restricted fluid. *Basic conditions* are caused by vegetable food, milk diet, and a large amount of fluids.

4. The two sugars are cane sugar and lactose. They are converted into glucose in the liver. When sugar is not assimilated, the excess appears in the urine.

5. Chemically, *fats* are esters of glycerol with a fatty acid; most of them are mixtures of glyceryl tripalmitate, glyceryl tristearate, and glyceryl trioleate.

Fats are formed in the body from the food ingested, chiefly (1) the fats and (2) the carbohydrates.

In the alimentary canal the fat is split up into glycerol and fatty acid, these are absorbed by the cells covering the villi of the intestine and are here again converted into fat.

Excessive fat in the feces is an indication that more fat has been taken in than could be absorbed.

The fats are utilized in the body for the production of force or to be stored as adipose tissue to be used later; they therefore serve for the production or maintenance of heat and for the performance of work. The products of combustion of fat are CO_2 and H_2O.

6. During digestion the proteids are split up into proteoses, peptones, polypeptides and amino-acids. The amino-acids are believed to be taken as such by the epithelial cells and carried to the blood of the portal capillaries. Another view is that in the intestinal epithelium the amino-acids are built-up again into

proteins such as are found in the blood. There are three theories of the further history of the proteids. According to one of them (the theory of Voit), "the protein of the tissues, living or organized protein, is to be differentiated from the absorbed circulating protein. It is only in this circulating protein, which is assumed to be present in the fluids of the body, the blood and lymph, that catabolic changes take place. These changes take place under the influence of the living cells. The more resistant organized protein is not supposed to undergo catabolic changes. If any of it does, it is cast off into the fluids of the body, and thus becomes circulating protein, undergoing catabolic changes in precisely the same manner. It is obvious that a small part of the absorbed protein must be utilized to replace the waste of the organized protein and to subserve the process of growth. This portion is termed tissue protein."—(Lyle's *Physiology.*)

7. The various carbohydrates used in infant feeding are sugars and starches. Sugars, particularly lactose, are useful; but starches should not be given before the period of teething, as the infant is not capable of digesting starches until that time.

8. *Kernig's sign.* The patient lies on his back with the thigh at right angles to the body; he then tries to extend his leg and so bring it into a line with the thigh. In case of cerebrospinal meningitis this is nearly always impossible.

Babinski's sign. If the skin of the sole of the foot is irritated, there will be noticed extension of the toes instead of flexion. It is found in lesions of the pyramidal tract.

9. CONGENITAL ATELECTASIS. "This is a condition in which the alveoli of the lungs have not become filled with air at birth, but remain empty and collapsed. The child makes only faint efforts at breathing, the skin feels cold, and the temperature is only 97°F. The fingers and toes are blue, and the cry is faint; the child is unable to suckle; the pulse is hardly perceptible, and the fontanelle is deeply depressed. Auscultation reveals little air entering the chest, and at the bases and along the borders of the lungs vesicular sounds may be entirely absent. Percussion will give some dullness at the bases and along the borders of the lungs close to the spine. Cases of this severity live but a few hours, but many others, not so extensive, may, by energetic treatment, recover."

Treatment. "Artificial respiration; the warm bath; rubbing the back with whisky; dashing cold water on

the chest, are the means used when the child is born apparently lifeless. It is very necessary that the body-heat be maintained, therefore keep the child in a warm room, and roll it in cottonwool. If unable to suckle, it must be spoon-fed, and it should get 5 drops of brandy in a spoonful of hot milk every hour. Stimulating liniments and the mustard-bath are also serviceable, and the inhalation of oxygen may be tried."—(McCaw's *Aids to Diseases of Children*).

PRACTICE OF MEDICINE.

1. *Aphasia* is partial or complete loss of the power of expressing or of understanding spoken or written language; it is due to a cortical lesion and not to peripheral lesions. Loss of power to produce the various movements necessary to speech is called *Motor aphasia;* loss of memory for words, or inability to perceive and interpret words is called *Sensory aphasia.* In motor aphasia the central lesion is located in Broca's convolution (on the left side in right-handed people).

2. *Multiple neuritis* is an inflammation of a number of nerves either simultaneously or in rapid succession. It may be due to poisons (alcohol, lead, arsenic), or diseases (syphilis, sepsis, gout, diabetes, malaria, diphtheria), or general malnutrition. It may begin insidiously, and is generally characterized by numbness or tingling in hands and feet, cramps, disturbances of sensation and motion, wasting and paralysis; the distinctive feature is the symmetrical location of the symptoms. Treatment consists in removal of the cause (if possible), general tonics, morphine for the pain, bromides or chloral for the insomnia, strychnine for the paralysis; massage and electricity are useful.

3. *Diabetes* (*mellitus*) is a constitutional disease characterized by polyuria, excess of sugar in the blood and excretion of the same in the urine, and accompanied by severe emaciation.

Etiological factors are said to be:—Age between 40 and 60, Jewish race, worry, nervous strain, and lesions of the pancreas. In the *treatment,* carbohydrates should be gradually removed from the diet until either the urine is free from sugar or the diet is free from carbohydrates. When the urine is free from sugar, carbohydrates may be gradually resumed, but must be reduced or stopped on the re-appearance of sugar in the urine.

4. In *gastralgia,* the pain is sudden, and burning, boring, tearing or lancinating, originating in the epigastrium and radiating in various directions.

In *ulcer of the stomach*, the pain varies from a gnawing sensation to a feeling of soreness in the epigastrium or a painful sense of lump or oppression. It is usually located in the epigastrium, more rarely in one or the other hypochondriac region, with a tendency to run to the back. The pain may occur within fifteen to twenty minutes after the ingestion of food, or it may be deferred until one or two hours after eating.

In *lead colic*, there is a violent outbreak of spasmodic abdominal pain. It may be chiefly umbilical, or epigastric, or diffuse over the entire abdomen.

In *appendicitis*, the pain may occur two or three hours after eating and may be relieved by eating. The location of the pain, roughly speaking, is epigastric, but lacks the accurate localization that is seen in ulcer. In many cases the pain is felt lower down in the abdomen below or to the right of the navel, and even though the pain may originate in the epigastrium radiation downward toward the umbilicus or lower abdomen may occur.

In *gallstone colic*, the pain is immediate, severe, and lancinating, appearing suddenly in the epigastrium and radiating to the right and upward or to the right side of the back. The pain is continuous, with periods of intense exacerbation, and is uninfluenced by food, fluids, or alkalies.—(From Lockwood's *Diseases of the Stomach.*)

In *peritonitis*, the pain is at first local and corresponds to the seat of the primary lesion, but soon becomes diffused and general. Except when due to perforation of a gastric ulcer, when it is referred to the chest, back, or shoulder, the greatest pain is below the navel. The pain is increased by pressure or movement

In *renal colic*, the pain is sudden and agonizing, having its origin in the lumbar region, and following along the course of the ureter. It is felt also in the testicle and down the inner side of the thigh, and is at times referred to the glans penis. It may last only a few minutes or for hours.—(From Butler's *Diagnostics of Internal Medicine*).

5. *Cause of secondary anemia:* Hemorrhages, nephritis, cancer, suppuration, tuberculosis, malaria, poisons (such as mercury), syphilis, and very high fevers.

Secondary anemia has an ascertainable cause; and a blood examination shows the red cells reduced to about 1,000,000 to the cubic millimeter, a relatively low hemoglobin estimate, a few normoblasts and

megaloblasts, and the white cells generally increased in number.

Primary pernicious anemia has no ascertainable cause; and a blood examination shows a marked reduction in the number of red cells, but a relatively high hemoglobin estimate; nucleated red cells are quite common; and the white cells are generally decreased.

6. An *aneurysm* is a pulsating sac containing blood, and communicating with the lumen of an artery. Aneurysms may be classified as:—true, false, and dissecting; also fusiform, and sacculated.

ANEURYSM OF ASCENDING AORTA.	ANEURYSM OF TRANSVERSE AORTA.
Physical signs. *Pulsation* often expansile, in second and third interspaces.	Pulsation in episternal notch.
On palpation, systolic thrill and diastolic shock to right of sternum.	Systolic thrill in episternal notch.
Dullness to right of sternum, above cardiac area.	Dullness over manubrium sterni.
Rough systolic murmur, loud clanging second sound. May have diastolic murmur from implication of aortic valve.	Murmur more distinct over manubrium. Diastolic murmur rare.
Parts liable to pressure and results of pressure. Vena cava superior; dilated superficial veins, edema of head and neck.	Left innominate vein; edema of left side of head and neck.
Innominate artery; weakness of right radial pulse.	Any branch of the arch; weakness of right or left radial pulse.
Heart; downward displacements of apex.	
Ribs to right of sternum; pain.	Manubrium sterni; pain.
Right bronchus; defective respiration on right side.	Trachea or left bronchus; paroxysmal dyspnea, altered cough, defective respiration on left side.
Right recurrent laryngeal (rarely); paralysis of right vocal cord.	Left recurrent laryngeal; paralysis of left vocal cord.

—(Wheeler and Jack's *Handbook of Medicine.*)

7. Obstruction of the common bile duct produces jaundice because the bile being unable to pass from the liver into the intestine is absorbed into the hepatic vein, and carried into the general circulation. The causes of jaundice from mechanical obstruction of the bile-duct, are given by Murchison as follows:—

(*a*) *Obstruction by foreign bodies within the duct:* Gallstones and inspissated bile; hydatids and distomata; foreign bodies from the intestines.

(*b*) Obstruction by inflammatory tumefaction of the duodenum, or of the lining membrane of the duct, with exudation into its interior.

(*c*) Obstruction by stricture or obliteration of the duct: Congenital deficiency of the duct; stricture from perihepatitis; closure of the orifice of the duct in consequence of an ulcer in the duodenum; stricture from cicatrization of ulcers in the bile ducts; spasmodic stricture.

(*d*) Obstruction by tumors closing the orifice of the duct, or growing in its interior.

(*e*) *Obstruction by pressure on the duct from without, by:* Tumors projecting from the liver itself; enlarged glands in the fissure of the liver; tumors of the stomach, duodenum, pancreas, kidney, or omentum; abdominal aneurysm; accumulation of feces in the bowels; pregnant uterus; ovarian and uterine tumors.

The *clinical manifestations* are: Jaundice or discolored skin, some of the secretions are tinged with bile or contain bile pigment, there may be a bitter taste in the mouth, the digestion is disturbed, pruritus is generally present, there may be skin eruptions, xanthopsia is present, and there may be some cerebral symptoms; in addition to these, the inability of the pancreatic juice to reach the intestine will cause fatty stools, emaciation, and glyscosuria.

8. *Pellagra* is a chronic specific disease, probably infectious, characterized locally by erythema involving usually the exposed portions of the body surface and recurring from year to year during the summer months; characterized constitutionally by symptoms involving the gastrointestinal tract and the mental and nervous systems. Languor and debility are frequent prodromata. Bacteria, maize, metazoa and protozoa have all been supposed to be the main etiological factor. The skin symptoms are the most striking, most constant, most characteristic and most important from a diagnostic standpoint. In their absence, a diagnosis of pellagra is unwarranted. The eruption usually appears suddenly as an erythema, irregular in outline, in-

volving most frequently the dorsal aspect of the hands. It is symmetrical, and may encircle the wrists or appear on the face. The skin becomes pigmented and thickened. Digestive disorders and dysentery often appear; and mental depression, insomnia, headache, vertigo, and tremors may be present. Treatment is chiefly symptomatic; arsenic (Fowler's solution or atoxyl) has been recommended.—(*Pocket Cyclopedia.*) The most recent methods of treatment are: "Organo-polymineralized serum"; salvarsan (intravenous injection); and direct transfusion of blood.

GYNECOLOGY AND OBSTETRICS.

1. The *liquor amnii* consists chiefly of water, but contains small amounts of albumin, epithelial cells, urea, phosphates, chlorides, etc. Its specific gravity is about 1.001 to 1.008. Its source is unknown; it is probably derived from the amnion, by transudation from the maternal vessels of the placenta.

2. *"Mendel's formula* may be set down as follows: if D represent a plant with the dominant red and its germplasm, and R one with the recessive white and its germplasm, then the first generation of crosses of D and R will all be DR, and if these DR individuals be crossed the result will be $x\,(DR + DR) = x\,(DD + 2DR + RR)$, or in other words, a dominant crossed with a recessive gives in the second generation, as regards this one particular feature, one dominant, two hybrids, and one recessive, and of these, each dominant will give nothing but dominants, each recessive nothing but recessives, and each hybrid the same proportion of dominant, hybrid, and recessive."—(Adami and McCrae's *Text-Book of Pathology*).

3. The *pelvic floor* is composed of skin, connective tissue, pelvic fascia, perineal fascia, levator ani, coccygeus, sphincter ani, transversus perinei, constrictor vaginæ, and triangular ligament.

4. *Some of the indications for producing sterility in a woman* are: Excessive pelvic deformity rendering delivery of a living child either impossible or decidedly dangerous to the mother; advanced tuberculosis.

The operation may be a ligature and division of the two Fallopian tubes.

5.

INVERSION OF UTERUS.	UTERINE POLYPUS.
1. No pedunculated attachment to uterus.	1. Attached to uterine wall by broad surface or by narrow pedicle.

INVERSION OF UTERUS.	UTERINE POLYPUS.
2. Uterine cavity being obliterated, sound can be passed but short distance, in incomplete and not at all in complete inversion.	2. Sound passes by the side of the mass through external os far into uterine cavity.
3. Vaginal or rectal conjoined examination shows a ring or depression where the uterus should be, and fails to show the uterus above the vagina.	3. Uterus felt above vagina.
4. The inverted uterus is a symmetrical pyriform body.	4. Not usually symmetrical and may be very asymmetrical.
5. Orifices of the Fallopian tubes usually demonstrable.	5. Not present.
6. Muciparous glands of the uterus present and microscopially demonstrable.	6. Not present, or if present less perfectly developed.

—(Dudley's *Gynecology*).

In *chronic inversion of the uterus*, the patient is anesthetized and the uterus is reduced and kept in place by means of a repositor. Sometimes a celiotomy must be performed to allow of the reduction; and sometimes amputation of the uterus is expedient.

Uterine polypus will require dilatation of the cervix and removal of the polypus by cutting through the pedicle.

6. *The normal course of delivery in occipito-posterior positions*, is the same as in occipito-anterior positions except that the head must rotate to the front through three-eighths of a circle; of course this takes longer and is more tedious.

In abnormal cases, the management is as follows:

"(*a*) *When diagnosed while the head is at the brim.* (1) Leave it alone. The occiput will probably rotate to the front all right if it is given plenty of time. (2) If flexion appears to be deficient, try to increase it by pushing up the sinciput with the fingers in the vagina during a pain, at the same time pressing down upon the fundus with the other hand. (3) The head may be rotated by passing the hand into the vagina and grasping it between the fingers and thumb. At the same

time the shoulders must be rotated by abdominal palpation, or else the head will at once go back to its original position. This maneuver requires an anesthetic.

"(*b*) *When diagnosed after the head has entered the pelvis.* (1) Leave it alone. After exercising the patience of all concerned, it will probably rotate spontaneously. Only about one case out of twenty fails to do so. (2) An attempt may be made to increase flexion as before. (3) Manual rotation may be attempted as before, but the head must first be flexed and gently pushed back out of the pelvis. (4) If the pains are weak, forceps should be applied well back on the head, so that when traction is applied, flexion will be promoted. The head should then be pulled well down on to the pelvic floor. If it begins to rotate, take off the forceps and leave the rotation to nature, merely keeping the head on the pelvic floor by pressure on the fundus. After rotation the forceps may, if necessary, be reapplied and delivery completed.

"(*c*) When the occiput has definitely rotated into the hollow of the sacrum, and the case has become a persistent occipitoposterior, forceps should be applied and the head delivered with the occiput posterior. The perineum should be guarded as much as possible, and any tears stitched up at once. In extreme cases craniotomy and pubiotomy may require to be considered."
—(Johnstone's *Textbook of Midwifery.*)

In the latter case, the maternal mortality is *nil*; the fetal mortality is about 12 to 15 per cent.

7. *Diseases of the breast liable to occur during the puerperium* are: Engorgement, inflammation, abscess, and cracked nipple.

Engorgement is treated by giving the patient salines, limiting the amount of fluid ingested, and compressing the breasts with a binder. *Inflammation* is treated by resting the part, supporting it, applying a hot boracic acid fomentation, nursing from the affected breast should be stopped at once. *Abscess* is treated by making an incision radiating from the nipple, and drainage; thorough antiseptic and aseptic precautions must be observed; the breast should be put at rest for a couple of days; saline cathartics may be necessary, also supportive measures. *Cracked nipples* require to be kept clean and dry; they may be protected by a nipple shield while the infant is nursing; an application of tannic acid, or nitrate of silver may be used.

Prophylactic measures consist in not touching the breasts (by doctor or nurse or patient) without thoroughly clean hands; by washing and drying the nipple

before and after nursing, and by proper attention to hygienic conditions before labor, and the nipple and breasts being preserved from pressure.

8. *The indications for emptying the uterus* are: "Intractable toxemia of pregnancy, chronic nephritis, extensive vascular degeneration of the chorion, irreducible retroversion of the pregnant uterus, absolute contraction of the pelvis, death of the fetus, chorea, pernicious anemia or leucemia.

"*At two months*, the operation can be carried out at one sitting by the method of dilatation by graduated bougies. This is carried out exactly as for a curettage. The genitals are cleansed and shaved, the vagina washed out, and the cervix fixed and drawn down by vulsella. The dilators are then passed in one after the other until the cervix admits one or even two fingers. The ovum is then separated, and extracted by the fingers or an ovum forceps.

"*At six months* the patient is anesthetized and placed in the lithotomy position. After the external parts have been scrubbed, the operator puts on boiled gloves and washes out the vagina. The cervix is then exposed by the speculum and drawn down by the vulsella. If necessary the os may be dilated by one or two Hegar's dilators sufficiently to admit the finger, which is then swept round the lower uterine segment and the membranes separated. One bougie is then gently introduced between the membranes and the uterine wall, great care being taken not to rupture the membranes. If difficulty is met with in passing the bougie, force must not be used, as the obstruction is probably due to the edge of the placenta. The bougie must be withdrawn and inserted in another direction. If no obstruction is encountered, the bougie should be passed in as far as it will go, which usually leaves about an inch or so projecting outside the cervix. A second and even a third bougie may be introduced in like manner. The ends of the bougies are then wrapped in sterile gauze and left in the vagina, which is lightly packed. The patient is kept in bed afterwards. Labor may be expected in about twelve hours, although it may start within half an hour, or be postponed for thirty-six hours, or even a day or two. Hot vaginal douches may be given every few hours in the meantime. If labor has not ensued after forty-eight hours, the bougies should be withdrawn, the vagina well douched, and either a fresh set of bougies introduced or the cervix tamponed with sterile gauze soaked in glycerin. If labor ensues after the introduc-

tion of the bougies they should be left *in situ* until expelled by the uterus. If removed too soon the labor may stop and the pains pass off again."—(Johnstone.)

SURGERY.

1. *Hematuria may be produced by:*—Inflammation, congestion, contusion of kidney, ureter, or bladder; stone in kidney, ureter or bladder, catheterization; tumors of bladder or kidney; urethritis; traumatism; purpura; hemophilia; scurvy; metallic poisons; the *Bilharzia hæmatobia:*

2. *Resection of the elbow-joint:*—"The patient is supine, but inclining to the sound side, the affected arm being held almost vertical, with the forearm flexed and nearly horizontal. The incision is made on the posterior surface of the joint. A single posterior incision is usually employed. An incision is made a little internal to the long axis of the olecranon, beginning two inches above and terminating two inches below the tip of the olecranon. This incision goes down to the bone, and throughout the entire operation the surgeon must guard and shield the ulnar nerve. The periosteum and soft parts are well separated; the olecranon is sawn off; forced flexion exposes the joint cavity freely, and enables the surgeon to lift the periosteum and soft parts from the humerus; the humerus is sawn through at the beginning of its condyloid processes; the radius and ulna are cleared and are sawn at a level below that of the base of the coronoid process of the ulna. Diseased tissues are cut and scraped away; the wound is irrigated, sutured, drained, and dressed. In some cases an H-shaped incision is employed, but the cicatrix of a transverse cut will limit flexion of the limb." (Da Costa's *Surgery.*) The ulnar and posterior interosseous nerves are to be specially guarded.

3. The *various dislocations of the shoulder-joint* are: (1) Subcoracoid—forward, inward, and downward. (2) Subglenoid—downward, forward and inward. (3) Subspinous—backward, inward, and downward. (4) Subclavicular—forward, inward, and upward.

"In *subcoracoid dislocation*, the head of the bone lies below the coracoid process upon the neck of the scapula. The tendon of the subscapularis is torn or stretched over the neck of the humerus. The supraspinatus, infraspinatus, and teres minor are either tightly stretched, producing external rotation, or torn (sometimes with great tuberosity), with internal rotation. There will be found: Local contusion; restricted mobility; flattened outer border of shoulder; head of the bone

is felt below outer end of clavicle; elbow is displaced from the side outward and backward, and cannot touch the chest wall when the hand is placed on the opposite shoulder; there is little or no shortening. *Treatment:*—Kocher's method: Anesthetize. Elbow is held to the side. Hand is brought forward and outward, so as to externally rotate the humerus and relax the external rotators. Elbow is adducted to the mid-line—this makes the margins of the gap in the capsule tense. Elbow is raised, so as to slacken upper margin of the rent and keep lower tense. Hand is placed on the opposite shoulder, *i.e.* arm is rotated inward, to make the head of the humerus slip into capsule. Elbow lowered."—(Groves' *Synopsis of Surgery.*)

4. *In ligation of the lingual artery:* "The incision is a curved one two inches long, its concavity directed upward from the anterior edge of the sternocleidomastoid muscle, half an inch above the great horn of the hyoid bone, to a point one inch within the median line of the neck. Divide the skin and platysma, displacing the superficial veins, and open the deep fascia, when the submaxillary gland will be exposed; this is displaced upward with the handle of the knife, when the tendon of the digastric muscle attached to the hyoid bone, and the hypoglossal nerve will be exposed; next divide the fibers of the hyoglossus muscle midway between the hypoglossal nerve and the hyoid bone, and the lingual artery will be exposed. The needle should be passed around the vessel from above downward, in order to avoid the nerve."—(Wharton.)

5. "In the treatment of compound fractures the main object is to render the wound aseptic and to give efficient exit to the discharges. For this purpose the patient should in all cases be anesthetized, the limb shaved, and thoroughly purified, and the wound enlarged and thoroughly washed out with some reliable antiseptic. It may be advisable to excise torn and dirty fragments of skin, muscle, and tendon, especially when dirt has been ground into them. Loose fragments of bone are removed and portions denuded of their periosteum may be taken away lest necrosis should ensue; where fragments retain any considerable connection with the soft parts they may be left without fear. When a sharp end of one of the fragments is protruding through a small opening in the skin it is first purified thoroughly before attempting its reduction and then replaced after enlarging the wound in the skin, or a portion sawn off. Hemorrhage is dealt with in the usual way, and the fragments are placed

as nearly as possible in their normal position. If the fragments can be brought accurately into position it is well to fix them by some mechanical appliance; but where the ends of the bone are much comminuted the small portions must be arranged in position as well as possible, and no attempt made to wire them. A good-sized drainage tube is inserted, and, if need be, counter-openings are made; the external wound is closed or not, according to circumstances, and dressed, and suitable splints are then applied."—(Rose and Carless.)

6. ACUTE INFECTIVE OSTEOMYELITIS. "*Symptoms.*—The disease begins with a rigor, high temperature, and severe pain. The part becomes swollen, infiltrated, and congested, with distended veins over it. The pulse is rapid and small and the tongue dry, and delirium soon comes on. It should be distinguished from acute rheumatism by the fact that the interarticular and not the articular region is affected. Fluctuation can be detected if the bone be superficial, or the abscess may burst on the surface. The bone is then found to be bare over the extent of the abscess cavity. When the bone is deeply seated or the disease confined to the medulla, the swelling is later in evidence, but the pain and toxemia are very severe, and the patient may die from this before local signs show themselves. When the epiphysis is attacked, septic arthritis often quickly follows, and a loose flail joint may result.

"*Treatment* must be very prompt. A free incision must be made through the periosteum and the pus evacuated. In any case, whether pus is found or not, the surface of bone must be gouged away to expose the medulla freely, and any gangrenous tissue scraped out. The cavity must then be washed out and freely drained. The wound in the soft structures is not closed in any part. If symptoms of pyemia occur, it may be necessary to amputate the limb through the joint or bone above, so as to cut off the source of emboli. When a large portion of, or the whole diaphysis is necrosed, there are two courses; either to cut short the disease by removing the dead portion at once, or to leave the sequestrum to stimulate the formation of an involucrum. Where there is a single bone, as in the arm and thigh, the sequestrum is left; where there is a double set of bones, as in the forearm and leg, the sequestrum is removed at once. Celluloid, zinc, and ivory rods have been inserted to stimulate osteogenesis. In most cases it is doubtful how much bone is actually dead, so that it is better to open up the cloacæ in the newly formed involucrum to remove the sequestrum.

The cavity heals by granulation."—(*Aids to Surgery.*)

7. A *chancroid* is an ulcer, usually of venereal origin, due to infection with the bacillus of Ducrey.

Chancroid of the penis may be treated by being sprayed with peroxide of hydrogen, dried with cotton, then touched with pure carbolic acid and then with pure nitric acid; afterwards a dressing soaked with black wash may be applied. The penis should be soaked in hot salt water every few hours, the above treatment being repeated.

The *incubation period* is about five to ten days.

8. *Tracheotomy:*—"The patient is placed on the back with a narrow pillow under the neck. Chloroform or cocaine can be used as anesthetics. An incision, one and a half inches long, is made downward from the cricoid cartilage, keeping strictly in the mid-line. The incision is deepened till the tracheal rings and isthmus are exposed. Enlarged veins give trouble during this stage if there is dyspnea. A director-hood is thrust into the trachea, and the point of a knife is slid along the groove to open the trachea from below upward. The patient is allowed to cough for a few minutes while the wound is kept open with dilating forceps; then the tube is tied in."—(*Aids to Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

Ohio State Board of Medical Examiners.

ANATOMY.

1. Name the subdivisions of the abdominal cavity.
2. Give a description of the knee joint.
3. Name the carpal bones.
4. Describe the prostate gland.
5. What is the length of the intestine and its divisions?

PHYSIOLOGY.

1. Describe the functions of visceral muscle.
2. What is the nature of the nerve impulse? Discuss nerve fatigue.
3. What are the advantages of a mixed diet? How does a purely protein diet affect metabolism?
4. What is the mode of secretion and discharge of the bile?
5. Give histology of blood plates.
6. Discuss intravascular coagulation. What pathological conditions of the vessels favor its development?
7. Locate the cardio-accelerator center. How is the heart rate affected through the vagus nerve?

8. Describe Cheyne-Stokes respiration. With what pathological states is it usually associated?
9. Describe effects of removal of parathyroid tissue.
10. What is the origin, distribution, and function of the third nerve?

CHEMISTRY.

1. Give the chemical formula for mercurous chloride, mercuric chloride, and mercurous nitrate. Give one characteristic of each.
2. State the difference between a physiological and chemical antidote for poison, and give an example of each.
3. What is organic chemistry? State the general properties of organic compounds.
4. Differentiate between fermentation and putrefaction.
5. What is methyl alcohol? Give formula, properties, and uses.

MATERIA MEDICA AND THERAPEUTICS.

1. Name the three principal serums. Give mode of administration and indication for use of each.
2. Name the different preparations of digitalis and aconite. Give dose and cumulative action of each.
3. Cocaine hydrochloride—its physiological action and principal uses. Give symptoms and treatment of an habitué.
4. For what purposes are diuretics employed. Name the principal ones. How are they usually classified?
5. Give the physiological action, use, and dose of salicylate of sodium.
6. Potassium salts—name the principal ones and give dose and use of each.
7. Name three external antiseptic remedies. Give indications, and state how each may be used.
8. Nux vomica—its therapeutic uses, important preparations—dose of each.
9. Give the indications for internal use of corrosive sublimate; state dose.
10. Give the therapeutic uses and state the dose of opium and its alkaloids.

DIAGNOSIS.

1. Give symptomatology of incipient pulmonary tuberculosis.
2. Give etiology and physical signs of myocarditis.
3. Describe difference in symptomatology of acute dilatation of heart and hypertrophy of heart.
4. How can the functional competency of each kidney be demonstrated?

5. Give differential diagnosis: ulcer of stomach, ulcer of duodenum, and cholecystitis.
6. Give early signs of hyperthyroidism.
7. Differentiate enlarged gall bladder and ptosed right kidney.
8. Describe physical signs of effusion in acute pleuritis.
9. What is the most important sign of leukemia?
10. What are the early signs of acute poliomyelitis?

PATHOLOGY.

1. What is the blood picture in myelogenous leukemia; give source of abnormal cells found.
2. What is a hemorrhagic infarct; what would be the course of such a condition—for example, in the kidney?
3. Describe tubercle formation, and the various pathological results in pulmonary tuberculosis.
4. Give method of preparing a vaccine for furunculosis.
5. Describe your precautions in treating a case of diphtheria: (*a*) for the physician; (*b*) for the patient's family; (*c*) for the general community.

PRACTICE.

1. Describe the symptom complex of uremia; tell how you might suspect it to be impending in a given case, and what treatment you would employ in an effort to avert it.
2. In what diseases should one be on the lookout for acute endocarditis, and how would you recognize its occurrence?
3. Give symptoms of cancer of the liver involving the neighborhood of the hepatic duct.
4. Given a case of a man of sixty-five of alcoholic history, with edematous ankles, dyspnea, and cough with occasional bloody expectoration, albuminuria, and blood pressure of 150 (sys.); what would be your presumptive diagnosis?
(*b*) Trace the prognosis of the case from the primary condition.
5. In an instance of alleged hematemesis, give other possible sources of the blood, and tell how you would recognize the origin in a given case.
6. Describe your treatment of a case of pulmonary tuberculosis, moderately advanced, involving chiefly one side, with a temperature of 101° Fahrenheit, and subject to occasional hemorrhage.
7. Give symptoms and treatment of a case of influenzal pneumonia.

8. Give symptoms of acute myelitis, differentiating it from multiple neuritis.
9. Mention some indications of cerebral syphilis. How would you make a positive diagnosis? Briefly outline the treatment.
10. How would you treat a case of acute articular rheumatism?

DERMATOLOGY, SYPHILOLOGY, AND DISEASES OF EYE, EAR, NOSE, AND THROAT.

1. Describe psoriasis. Give treatment.
2. Of what disease is the occurrence of pruritus ani a frequent sign?
3. Upon what evidence would you base a belief that a patient is cured of gonorrhea?
4. Describe signs and symptoms of congenital syphilis.
5. Outline an approved treatment of syphilis.
6. What are the dangers of acute suppurative inflammation of the middle ear?
7. Describe trachoma. Give treatment.
8. Describe tuberculous laryngitis.
9. Give treatment of acute suppurative inflammation of frontal sinus.
10. Give treatment of nasal polypi.

OBSTETRICS.

1. When would you be justified in inducing premature labor?
2. How would you diagnose the existence of pregnancy?
3. What are the symptoms of fetal death?
4. State the indications and contraindications for the use of the curette and describe the technique of this operation.
5. Name the stages of labor and describe the management of the third stage in detail.

SURGERY.

1. Shock: (*a*) Cause; (*b*) Symptoms; (*c*) Outline treatment.
2. Acute Suppurative Appendicitis. (*a*) Diagnosis: (1) Subjective and objective symptoms; (2) Differentiate between this and similar abdominal disorders; (3) Preliminary treatment. (*b*) Operation: (1) Surgical technique; (2) After treatment; (3) Prognosis.
3. Colles' Fracture: (*a*) Diagnosis; (*b*) Pathology; (*c*) Treatment.
4. Hip-Joint Disease: (*a*) Diagnosis; (*b*) Treatment—surgical, mechanical; (*c*) Prognosis.

5. Gunshot Wounds: (*a*) Give rule regarding probing; (*b*) Give rule regarding immediate operation; (*c*) In a gunshot wound of the knee what would be your course of pursuance?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Ohio State Board of Medical Examiners.

ANATOMY.

1. The abdominal cavity is divided into the abdomen proper and the pelvis.

2. The *knee joint* is a ginglymus, and is formed by the condyles of the femur, the head of the tibia, and the patella. "The *external ligaments*: the *anterior* or *ligamentum patellæ* is the continuation of the tendon of the triceps extensor. Above it occupies the apex and rough marking on the lower and posterior surface of the patella; below it is attached to the lower part of the tubercle of the tibia. There is a bursa between the upper part of the tubercle and the ligament. The *posterior ligament* (*ligamentum posticum Winslowii*), broad and thin, covers the back of the joint. It consists of a central and two lateral parts. The lateral parts spring above from the femur above the condyles and are attached below to the head of the tibia. The central part is derived from an expansion of the semi-membranosus tendon, and passes from the inner tuberosity of the tibia to the inner side of the upper part of the outer condyle of the femur. The *internal lateral ligament*, broad and flat, is attached above to the inner condyle of the femur; below, to the margin of the inner tuberosity, to the internal fibrocartilage, and to the inner surface of the shaft of the tibia for 1½ inches. The *long external lateral ligament*, a rounded cord, is attached above to the external condyle of the femur, and below to the external part of the head of the fibula, dividing the biceps tendon into two parts, a bursa intervening. The *short external lateral ligament*, very indistinct, lies parallel and behind the preceding, attached above to the outer condyle of the femur, and below to the styloid process of the fibula. The *capsular ligament*, thin, fills up the intervals between the special ligaments; it is attached to the margins of the articular surfaces of the bones, and blends with the fascia lata of the thigh: above it receives expansions from the vasti (*lateral patellar* ligaments).

"The *Internal Ligaments*: The *anterior* or *exter-*

nal crucial ligament is attached to the depression in front of the spine of the tibia and to the external semilunar fibrocartilage; it passes upwards, backwards, and outwards to the posterior part of the inner side of the external condyle of the femur. The *posterior* or *internal crucial ligament* is attached to a depression behind the spine of the tibia, to the popliteal notch, and the posterior border of external semilunar fibrocartilage, this latter slip being sometimes called the *ligament of Wrisberg;* it passes upwards, forwards, and inwards, the posterior fibers attached by side of oblique curve of inner condyle, the anterior ones to the fore part of intercondylar fossa and to the anterior part of the outer surface of the inner condyle. The *semilunar cartilages* are thicker at the circumferences than at the central margins and serve to deepen the cavities for the head of the femur. The *internal semilunar cartilage* is oval in shape, the anteroposterior diameter being the longer. Its anterior extremity is attached to the tibia in front of the anterior crucial ligament, and the posterior extremity in front of the posterior crucial ligament. The *external semilunar cartilage* is nearly circular; its anterior extremity is attached to the tibia in front of the spine, the posterior extremity to the back of the spine." (*Aids to Anatomy.*)

3. The carpal bones, from radial to ulnar side, are (in the first row) scaphoid, semilunar, cuneiform, and pisiform; (in the second row) trapezium, trapezoid, os magnum, and unciform.

4. The prostate gland is about the size and shape of a horse-chestnut, and surrounds the neck of the bladder and first part of the urethra in the male. It is surrounded by a dense capsule, and consists of three lobes (two lateral and one middle); it is pierced by the ejaculatory ducts and by the urethra. Its base is attached to the base of the bladder, and its apex is in relation with the posterior layer of the triangular ligament and the compressor urethræ muscle. The posterior surface is in relation with the rectum and is about an inch and a half from the anus.

5. The *small intestine* is about twenty-one feet in length, the *duodenum* being about ten inches, the *jèjunum* about eight feet, and the *ileum* about twelve feet. The *large intestine* is about five or six feet in length, the *cecum* being about two and a half inches, the *ascending colon* about five inches, the *transverse colon* about twenty inches, the *descending colon* about eight and a half inches, the *sigmoid colon* about seventeen inches, the *rectum* about five inches, and the *anal*

canal about one and a half inches. All these measurements are liable to variation, particularly those of the large intestine.

PHYSIOLOGY.

1. *The function of visceral muscle.* "In a general way is may be said that the visceral muscle determines and regulates the passage through the viscus or organ of the material contained within it. The food in the stomach and intestines is subjected to a churning process by the muscles, in consequence of which the digestive fluids are more thoroughly incorporated and their characteristic action increased. At the same time the food is carried through the canal, the absorption of the nutritive material promoted, and the indigestible residue removed from the body. The blood is delivered in larger or smaller volumes according to the needs of the tissues through a relaxation or contraction of the muscle fibers of the blood-vessels. The urine is forced through the ureters and from the bladder by the contraction of their respective muscles." (Brubaker's *Textbook of Physiology.*) During labor the uterus expels the fetus, followed by the placenta and membranes.

2. *The nature of the nerve impulse.* "As to the nature of the nerve impulse but little is known. It has been supposed to partake of the nature of a molecular disturbance, a combination of physical and chemical processes attended by the liberation of energy, which propagates itself from molecule to molecule. The passage of the nerve impulse is accompanied by changes of electric tension, the extent of which is an indication of the intensity of the molecular disturbance. Judging from the deflections of the galvanometer needle it is probable that when the nerve impulse makes its appearance at any given point it is at first feeble, but soon reaches a maximum development, after which it speedily declines and disappears. It may, therefore, be graphically represented as a wave-like movement with a definite length and time duration. Under strictly physiological conditions the nerve impulse passes in one direction only; in efferent nerves from the center to the periphery, in afferent nerves from the periphery to the center. Experimentally, however, it can be demonstrated that when a nerve impulse is aroused in the course of a nerve by an adequate stimulus it travels equally well in both directions from the point of stimulation. When once started, the impulse is confined to the single fiber and does not diffuse itself to the fibers adjacent to it in the same nerve trunk." (Brubaker's *Textbook of Physiology.*)

Nerve Fatigue. "Inasmuch as nerves are parts of living cells, the seat of nutritive changes, it might be supposed that the passage of nerve impulses would be attended by the disruption of energy-holding compounds, the production of waste-products, the liberation of heat, and in time by the phenomena of fatigue. Though it is probable that changes of this character occur, yet no reliable experimental data have been obtained which afford a clue as to the nature or extent of any such changes. Stimulation of motor nerves with the induced electric current for hours appears to be without influence either on the intensity of the nerve impulse or the rate of its conduction." (Brubaker's *Textbook of Physiology.*)

3. *Mixed Diet.* "The chemical composition of the tissues, taken in connection with their metabolism during starvation, implies that no one article of food is sufficient for tissue repair and heat production; but that all classes of food—in other words, a mixed diet—are essential to the maintenance of a normal nutrition. Experimental investigation has also conclusively established this fact. Moreover, the amounts of nitrogen and carbon eliminated daily, and the ratio existing between them, indicate the amounts of proteid, fat, and carbohydrate which are required to cover the loss." (Brubaker's *Textbook of Physiology.*)

Metabolism on a purely protein diet. "Notwithstanding the chemical composition of the proteins and the possibility of their giving rise to both fat and carbohydrate during their metabolism, it has been found extremely difficult to maintain the normal nutrition for any length of time on a pure proteid or fat-free diet. This, however, has been accomplished with dogs. It was found, however, that, in order to maintain the equilibrium, it was necessary to increase the proteins from two to three times the usual amount. Thus a dog weighing 30 to 35 kilograms required from 1500 to 1800 grams of flesh daily in order to get the requisite amount of carbon to prevent consumption of its own adipose tissue. Under similar circumstances, a human being weighing 70 kilograms would require more than 2000 grams of lean beef—an amount which, from the nature of the digestive apparatus, it would be practically impossible to digest and assimilate for any length of time. Even the slight habitual excess beyond the amount normally required is imperfectly assimilated and gives rise to the production of nitrogen-holding compounds which, on account of the difficulty with which they are eliminated by the kidneys, accumulate

within the body and develop the gouty diathesis, with all its protean manifestations." (Brubaker's *Textbook of Physiology.*)

4. *Mode of secretion and discharge of bile.* "Although the liver presents some physiological peculiarities there is no reason to believe that the conditions of secretion therein are different from those in any other secretory organ, or that any other structure than the cell is engaged in this process. As shown by chemical analysis, the bile consists of compounds, some of which, like the bile salts, are formed in the liver cells, out of material furnished by the blood by a true act of secretion, while others, such as cholesterin and lecithin, principles of waste, are merely excreted from the blood to be finally eliminated from the body. The bile is thus a compound of both secretory and excretory principles. The flow of bile from the liver is continuous, but subject to considerable variation during the twenty-four hours. The introduction of food into the stomach at once causes a slight increase in the flow, but it is not until about two hours later that the amount discharged reaches its maximum. After this period it gradually decreases up to the eighth hour, but never entirely ceases. During the intervals of digestion, though a small quantity passes into the intestine, the main portion is diverted into the gall bladder, because of the closure of the common bile duct by the sphincter muscle near its termination, where it is retained until required for digestive purposes. When acidulated food passes over the surface of the duodenum, there is an increase in the secretion, or at least the discharge of bile, and as this takes place after the nerves distributed to the liver are divided, the assumption is that an agent, possibly secretin, is developed in the duodenal mucous membrane, which, absorbed into the blood, is ultimately distributed to the liver cells and by which they are excited to activity. At the same time there is excited, through reflex action, a contraction of the muscle walls of the gall bladder and ducts, a relaxation of the sphincter, and a gush of bile into the intestine, the discharge continuing intermittently until digestion ceases and the intestine is emptied of its contents." (Brubaker's *Textbook of Physiology.*)

5. The blood platerlets are small granular or homogeneous discs, about 1.5 to 3.5 μ in diameter. The edges are rounded and well defined; they have no nucleus; they have been estimated at about 250,000 to 300,000 to the cubic millimeter of blood.

6. *Intravascular coagulation.* "So long as the rela-

tions of the blood and the vascular apparatus remain physiological, no coagulation occurs in the vessels. The reasons assigned for this are: (1) the absence of thrombo-kinase in sufficient amounts; (2) the presence of an antithrombin. On either assumption the reaction between prothrombin and calcium with the formation of thrombin does not take place. If the vessels are injured as they are when ligated or torn or in any way impaired, coagulation promptly takes place with the subsequent occlusion of the vessel. As to whether the injured tissues or the blood cells now generate an agent, thrombo-kinase, which activates the prothrombin and calcium, or whether they generate an agent thromboplastin, which neutralizes an antithrombin, is a subject of discussion." (Brubaker's *Textbook of Physiology*.)

7. *The cardio-accelerator center* is in the medulla. The vagus nerve is the inhibitory nerve of the heart; it slows the heart. Section of one vagus produces slight acceleration of the heart. A more marked effect occurs when both vagi are divided. The inhibitory action of the vagus is continuous.

8. *Cheyne-Stokes respiration* "is a condition in which the respirations gradually increase in volume and rapidity until they reach a climax, when they gradually subside, and finally cease for from ten to forty seconds, when the same cycle begins again. It may occur in tuberculous meningitis, cerebral hemorrhages, embolism, thrombosis, aneurysm of basilar artery, uremia, heart disease, etc." (Hughes' *Practice of Medicine*.)

9. *Removal of the parathyroids* is followed by twitching and spasms of the voluntary muscles, paralysis of the legs, increased frequency of respiration, and death.

10. The *third cranial nerve* (motor oculi) arises from the inner side of the crus cerebri, in front of the pons, and from the floor of the aqueduct of Sylvius. It enters the cavernous sinus and then passes forward to enter the orbit through the sphenoidal fissure. While in the sphenoidal fissure it divides into two branches. It is the motor nerve for the following five muscles of the eyeball, and is distributed to these muscles: the superior rectus, levator palpebræ superioris, internal rectus, inferior rectus, and inferior oblique muscles.

CHEMISTRY.

1. *Mercurous chloride*, Hg_2Cl_2, insoluble in water.
Mercuric chloride, $HgCl_2$, soluble in water.
Mercurous nitrate, $Hg_2(NO_3)_2$, is efflorescent.

2. *Physiological antidotes* act as such by combating

one or more of the physiological actions of the poison, such as opium for belladonna.

Chemical antidotes act as such by uniting chemically with the poison and thus converting it into a harmless or insoluble compound, such as magnesium sulphate for lead poisoning.

3. *Organic chemistry* is the chemistry of the carbon compounds.

General properties of organic compounds: They may be solids, liquids, or gases; if solid, may be crystalline or amorphous; they may be volatile or non-volatile, and they are very liable to undergo change when acted upon by heat or reagents. The more complex they are, the more readily they undergo change.

4. *Fermentation* is a form of decomposition of organic matter containing only carbon, hydrogen, and oxygen.

Putrefaction is a form of decomposition of organic matter which contains nitrogen in addition to carbon, hydrogen, and oxygen.

5. *Methyl alcohol* is the hydroxyl of methyl, CH_3OH. It is a colorless liquid having an ethereal and alcoholic odor and a sharp, burning taste. It burns with a pale flame, giving less heat than that of ethyl alcohol. It mixes readily with water, alcohol and ether, and is a solvent for sulphur, phosphorus, potash, soda, and resinous substances.

MATERIA MEDICA AND THERAPEUTICS.

1. *Antidiphtheritic serum* should be given to patients suffering from diphtheria, or even suspected to be suffering from that disease. It is given subcutaneously.

Antimeningococcic serum is injected into the spinal canal after the withdrawal of about 30 cc. of cerebrospinal fluid. It is administered to patients suffering from cerebrospinal meningitis.

Antistreptococcic serum is given in various diseases due to streptococcus infection (erysipelas, puerperal fever, septicemia, ulcerative endocarditis). It is given subcutaneously.

2. DIGITALIS. Fluidextract, ♏j; extract, gr. i-v; infusion, ℥ij; tincture, ♏xv.

Symptoms of cumulative effect of digitalis: Weak, dicrotic pulse, perspiration, nausea, vomiting, lowered reflexes, lowered body temperature, vertigo, muscular tremors, lassitude, delirium, stupor.

ACONITE. Fluidextract, ♏j; tincture, ♏x.

Symptoms of aconite poisoning usually manifest themselves within a few minutes; sometimes are de-

layed for an hour. There is numbness and tingling, first of the mouth and fauces, later becoming general. There is a sense of dryness and of constriction in the throat. Persistent vomiting usually occurs, but is absent in some cases. There is diminished sensibility, with numbness, great muscular feebleness, giddiness, loss of speech, irregularity and failure of the heart's action. Death may result from shock if a large dose of the alkaloid be taken, but more usually it is by syncope.

3. COCAINE HYDROCHLORIDE. *Physiological action:* Local anesthetic (externally); internally it is a muscular, cerebral, circulatory, and respiratory stimulant, also a mydriatic. Its *principal uses* are: As a local anesthetic; also in paralysis agitans, chorea, and alcoholic tremors.

The chief symptoms of an habitué, are:—"Emotional excitement, physical unrest, mental impairment, moral turpitude, hallucinations, mild epileptiform attacks, dilatation of the pupils, a rapid and feeble pulse, severe gastric disturbance, wasting and anemia. *Treatment*: The drug should be withdrawn rapidly but not suddenly. Treatment in a sanatorium is always advisable. Stimulants like strychnine are often useful. Hygienic and dietetic measures calculated to improve general nutrition are indicated." (Stevens' *Materia Medica.*)

4. *Diuretics are used:* To dilute the urine, to increase the flow of the urine, to remove liquids from the body (as in dropsy), to remove toxic substances from the body, and to stimulate atonic kidneys.

Diuretics are classified, as (1) Those that act as such by increasing the arterial pressure, digitalis, squills, and strophanthus are examples; (2) those that act by dilating the renal vessels, such as caffeine; (3) those that act as stimulants to the renal epithelium, such as caffeine, theobromine, scoparius, calomel; and (4) various salines which act by increasing the water in the blood, such as several of the salts of lithium and of potassium.

5. SODIUM SALICYLATE. *Dose*, 15 grains. *Physiological action:*—Antiseptic; irritant; strongly cholagogue; antipyretic; diaphoretic; diuretic (markedly increasing the excretion of uric acid). In exceptional instances skin eruptions are caused, and in some individuals a train of symptoms analogous to those of cinchonism, and designated as *salicylism*, results from the use of salicylic preparations.

Uses:—Externally, as antiseptic and stimulating applications and for the checking of abnormal perspiration; also in parasitic and other skin diseases. Internally, rheumatic fever (in which it seems to act as a

specific); gout; migraine; sciatica; diabetes; cholelithiasis. (Wilcox's *Materia Medica.*)

6. *Potassium salts:* Carbonate, gr. xv; bicarbonate, gr. xxx; acetate, gr. xxx; citrate, gr. xv; sulphate, gr. xxx; bitartrate, gr. xxx; nitrate, gr. vij; chlorate, gr. iv; permanganate, gr. j; iodide, gr. vij; bromide, gr. xv; cyanide, gr. 1/5.

The *carbonate* and *bicarbonate* are used for itching and for skin diseases; the latter is also used for dyspepsia, rheumatism, gout, jaundice, and gall stones. The *acetate* and *citrate* are used for gout, rheumatism, in dropsy, renal diseases, cardiac diseases, and in general as diuretics. The *sulphate* and *bitartrate* are used as cathartics, the latter also as a diuretic. The *nitrate* is used (by inhalations of its fumes) in asthma. The *chlorate* is used for inflammatory conditions of mouth and throat. The *permanganate* is used for wounds, sores, ulcers, erysipelas, and as a douche in gonorrhea, gleet, etc.; also as an antidote to morphine poisoning. The *bromide* is used in epilepsy, insomnia, neuralgia, migraine, delirium tremens, convulsions, nymphomania. The *iodide* is used in syphilis, asthma, chronic rheumatism. The *cyanide* is used to relieve vomiting, gastrointestinal pain, and cough.

7. *Three external antiseptics:*—For *rooms and furniture*, sulphur dioxide, generated by burning three pounds of sulphur for each 1000 cubic feet of space; for *hands of surgeon*, mercuric chloride, in solution of 1:1000; for *glassware*, dry heat at about 150° C., continued for an hour.

8. NUX VOMICA. *Preparations and Doses* Extractum nucis vomicæ, gr. ¼; fluidextractum nucis vomicæ, ♏j; tinctura nucis vomicæ, ♏x; strychnine, gr. 1/64; strychinæ sulphas, gr. 1/64; strychinæ nitras, gr. 1/64. *Therapeutic indications:* As a general tonic or bitter; in indigestion, cardiac depression, impaired peristalsis, pneumonia, phthisis, amenorrhea, dysmenorrhea, impotence, some forms of paralysis, chorea, epilepsy, neuralgia, alcoholism, and urinary incontinence.

9. *Corrosive sublimate is used internally* in the treatment of diphtheria, syphilis, and as a tonic. Dose, gr. 1/100 to 1/20.

10. OPIUM. *Therapeutic uses:* As an anodyne, a hemostatic, in inflammations, as an expectorant, in diarrhea, in alcoholism, manias and diabetes, as an antispasmodic, in insomnia, and as a diaphoretic.

Dose: Of powdered opium, gr. j; morphine, gr. 1/5; morphine sulphate, acetate, and hydrochloride, each gr. ¼; codeine, gr. ½; codeine sulphate and phosphate, each, gr. ½.

layed for an hour. There is numbness and tingling, first of the mouth and fauces, later becoming general. There is a sense of dryness and of constriction in the throat. Persistent vomiting usually occurs, but is absent in some cases. There is diminished sensibility, with numbness, great muscular feebleness, giddiness, loss of speech, irregularity and failure of the heart's action. Death may result from shock if a large dose of the alkaloid be taken, but more usually it is by syncope.

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Uses:—Externally, as antiseptic and stimulating applications and for the checking of abnormal perspiration; also in parasitic and other skin diseases. Internally, rheumatic fever (in which it seems to act as a

dullness, vertigo, often relieved by a copious epistaxis, and finally dropsy beginning in the lower extremities. The condition terminates in death by exhaustion." (Hughes' *Practice of Medicine.*)

4. *The functional activity of each kidney* may be "determined by the intramuscular injection of 1 cc. of a 5 per cent. acqueous solution of methylene blue; the collection of the urine (from each kidney) after the lapse of one-half hour, one hour, and hourly thereafter; and noting the time of the appearance of a bluish tint to the urine, the time of maximum coloration, and the time of disappearance of the coloring. Normally a slight tint may be observed in the first specimen, certainly at the end of one hour. The maximum coloration occurs at the end of three or four hours, and the urine is free of coloring at the end of thirty-six to forty-eight or sixty hours. Delay of beginning excretion beyond one hour, and of maximum coloration beyond the fourth hour, and continuation of excretion, as may occur for five or six days, is indicative of deficient functional activity." (Kelly's *Practice of Medicine.*)

5. *Gastric ulcer* is generally caused by injury or bacteria, is most apt to occur between the ages of twenty and forty-five. After eating there is pain localized in the stomach, vomiting occurs soon after eating, hematemsis is common, there is localized tenderness over the stomach, and examination of the gastric contents shows an excess of free HCl.

In *duodenal ulcer* the pain is apt to be more to the right, and to occur at an interval of two or three hours after meals; the hemorrhages will be intestinal, and the blood will be passed by way of the bowels, and not vomited. In many cases the symptoms are identical with those of gastric ulcer.

Cholecystitis: The pain is further to the right, and with tenderness and muscular rigidity, is referred to the region of the gall bladder; there are rise of temperature, increased pulse rate, leucocytosis, and vomiting.

6. *Hyperthyroidism* is exophthalmic goiter; the cardinal symptoms are tachycardia, exophthalmos, goiter, and tremor.

7. In *enlarged gall bladder* pain is located in the region of the liver and may radiate to the right shoulder; there may be jaundice.

In *ptosis of the right kidney* the kidney may be palpated and often replaced; the pain radiates down the ureter; chill, nausea and vomiting may be noticed; blood may be found in the urine; when the kidney is replaced all the symptoms cease.

nal crucial ligament is attached to the depression in front of the spine of the tibia and to the external semilunar fibrocartilage; it passes upwards, backwards, and outwards to the posterior part of the inner side of the external condyle of the femur. The *posterior* or *internal crucial ligament* is attached to a depression behind the spine of the tibia, to the popliteal notch, and the posterior border of external semilunar fibrocartilage, this latter slip being sometimes called the *ligament of Wrisberg;* it passes upwards, forwards, and inwards, the posterior fibers attached by side of oblique curve of inner condyle, the anterior ones to the fore part of intercondylar fossa and to the anterior part of the outer surface of the inner condyle. The *semilunar cartilages* are thicker at the circumferences than at the central margins and serve to deepen the cavities for the head of the femur. The *internal semilunar cartilage* is oval in shape, the anteroposterior diameter being the longer. Its anterior extremity is attached to the tibia in front of the anterior crucial ligament, and the posterior extremity in front of the posterior crucial ligament. The *external semilunar cartilage* is nearly circular; its anterior extremity is attached to the tibia in front of the spine, the posterior extremity to the back of the spine." (*Aids to Anatomy.*)

3. The carpal bones, from radial to ulnar side, are (in the first row) scaphoid, semilunar, cuneiform, and pisiform; (in the second row) trapezium, trapezoid, os magnum, and unciform.

4. The prostate gland is about the size and shape of a horse-chestnut, and surrounds the neck of the bladder and first part of the urethra in the male. It is surrounded by a dense capsule, and consists of three lobes (two lateral and one middle); it is pierced by the ejaculatory ducts and by the urethra. Its base is attached to the base of the bladder, and its apex is in relation with the posterior layer of the triangular ligament and the compressor urethræ muscle. The posterior surface is in relation with the rectum and is about an inch and a half from the anus.

5. The *small intestine* is about twenty-one feet in length, the *duodenum* being about ten inches, the *jèjunum* about eight feet, and the *ileum* about twelve feet. The *large intestine* is about five or six feet in length, the *cecum* being about two and a half inches, the *ascending colon* about five inches, the *transverse colon* about twenty inches, the *descending colon* about eight and a half inches, the *sigmoid colon* about seventeen inches, the *rectum* about five inches, and the *anal*

ery, and contains bacilli. Around it are arranged layers of epithelioid cells. Beyond these are collected many leucocytes, which merge through granulation tissue into the normal structures. The structure is not so typical in all cases, as giant cells may be absent. No blood vessels are present in tubercles, and the surrounding vessels are narrowed or obliterated by endarteritis."

Results.—"(1) *Caseation* is a result of progressive action of the bacilli. Two factors contribute to this: (1) The destructive action of the bacillus; (2) the defective blood supply from endarteritis. The center of each tubercle softens and becomes yellow or caseous. Neighboring tubercles after caseating coalesce, and a tuberculous abscess is formed and in its walls further miliary tubercles are found. (2) *Retrogressive changes.*—The resistance of the tissues is considerable, and if circumstances are favorable the bacilli are destroyed or their growth inhibited and retrogressive changes occur. The tubercle may be converted into fibrous tissue, and only a cicatrix remains; or the caseous matter may become encapsuled, and perhaps resume activity at some later date, if the capsule is ruptured by some injury. Sometimes calcification occurs. (3) *Diffusion* is a marked feature. This may be (1) local, by direct extension; (2) to distant viscera, by minute emboli; (3) acute general tuberculosis may occur in any case. Tubercles are scattered throughout the body, and the disease is fatal in a few weeks."—(*Aids to Surgery.*)

4. *Method of preparing vaccine.*—"(1) The causal organism (in this case the *Staphylococcus pyogenes*) is obtained from the seat of the lesion and isolated in pure culture at 37° C. on a suitable medium such as agar. (2) The culture growth is emulsified in about 5 c.c. of a 0.9 to 1.0 sodium chloride solution. (3) The bacterial emulsion is transferred to a water bath or incubator, and kept at 60° C. for from thirty to sixty minutes. (4) The number of bacteria in the emulsion is estimated. (5) The vaccine is diluted with normal saline solution until each cubic centimeter contains an appropriate number of organisms for the dose, *e.g.* 10 millions, 100 millions, 1,000 millions, etc. (6) The sterility of the emulsion is proved and a small amount of antiseptic, *e.g.* phenol 0.5 per cent. or tricresol 0.25 per cent., is added, and the vaccine is filled into sterile bulbs for use. In practice the bulb is opened, the contents are filled into a sterile syringe, preferably all glass, and the vaccine is injected subcutaneously under strict aseptic precautions."—(Bruce's *Materia Medica and Therapeutics.*)

5. The *physician* should wear a gown while with the patient, should inspect the patient's eyes, nose, and throat through a pane of glass so that the patient may not cough in his face, and should carefully wash his hands in an antiseptic solution before leaving. The *patient* should be isolated, and the nose, throat, and mouth should be washed with an antiseptic solution; diphtheria antitoxin should be administered as early as possible. The *family* should be kept away from the patient, and all infected articles should be soaked in a solution of corrosive sublimate or carbolic acid. The *community* is protected by the above procedure; but, in addition, the disease should be reported to the proper health authorities, other children from the family should not be allowed to go to school or church or other public places, strict quarantine must be observed, and there must be a thorough disinfection at the close of the case.

PRACTICE.

1. *Symptoms of uremia.*—Headache, insomnia, convulsions, vomiting, delirium, dyspnea, amaurosis, and coma. Uremia may be suspected from the presence of nephritis, a urinous odor of the breath, scanty urine, and increased arterial tension.

The patient should be put to bed; croton oil (1 minim) may be administered; vensection and dry cupping over the kidneys may be tried; diaphoretics are useful.

2. *Endocarditis* is apt to occur during or following rheumatism and scarlet fever. The signs and symptoms may be negative; but there is generally some alteration in the character of the heart sounds, and dilatation of the heart may be present; the pulse rate is often increased. The sounds heard depend upon the valve affected, and since the mitral valve is the one most commonly involved there is apt to be a systolic murmur heard best at the apex and transmitted to the left axilla.

3. *Symptoms of cancer of liver.*—Pain, tenderness, and a sense of weight in the hepatic region; emaciation and weakness; cachexia; jaundice, vomiting, and fever.

4. The case is one of cardiac decompensation, following endocarditis (which may have been due to rheumatism, scarlet fever, or some other infection). The prognosis of endocarditis is good so long as compensation is maintained; but is unfavorable when compensation is ruptured.

5. In a case of alleged hematemesis other possible sources of the blood are: The blood may have been swallowed (as in epistaxis, after tonsillectomy, pulmonary hemorrhage). The main question is to differentiate between *hematemesis and hemoptysis:*

Hematemesis.	Hemoptysis.
1. Previous history of gastric, hepatic, or splenic disease.	1. Previous history of pulmonary troubles.
2. Blood is vomited.	2. Blood is coughed up.
3. Blood is dark colored and not frothy.	3. Blood is frothy and bright red.
4. Blood may be mixed with food.	4. Blood may be mixed with sputa.
5. Giddiness or faintness usually precedes vomiting.	5. Sensation of tickling in the throat usually precedes.
6. Nausea and weight in epigastrium.	6. Dyspnea and pains in the chest.
7. Often followed by melena (black, tarry stools).	7. Is not usually succeeded by melena.

—(Hughes' *Practice of Medicine.*)

6. *Treatment of pulmonary tuberculosis:*—"By day the consumptive should be, short of actual fatigue, as much as possible in the open, and at night the windows should be widely open top and bottom. Where there is fever he must keep to bed; but when possible the bed should be outside, and where that is not possible the windows must remain open in presence of fever or any other acute symptom. In ordinary circumstances he should sleep alone. A stuffy bedroom with several people in it means rapid deterioration for the patient, and infection for the rest. *Sanatorium treatment* is not yet possible for all, nor, except in incipient cases, and in the rich, can it be continued long enough for cure; but it reduces the disease to a quiescent stage, and trains the patient in the habits he must afterwards continue. Sea voyages undoubtedly do good in many cases of early phthisis, the comparative sterility of the air contributing to the result; but no consumptive who is not a good sailor should be sent on such a voyage, nor any one who is unable to travel in comparative comfort, or who must travel alone. In the later stages sea voyages are contraindicated. If change of climate is decided upon, the place selected should be sunny, and should give facilities for the open-air life. Either a dry cold climate may be chosen or a warm one, according to circumstances. In the earlier stages cold dry air is best. High altitudes are, however, unsuitable for those with a tendency to hemoptysis. Adjuvants to the open-air treatment are *exercise*

and *dietetic treatment.* The consumptive should wear wool or flannel next the skin, but should not be overloaded with heavy clothes. Tepid baths, followed by brisk rubbing, are of benefit, and much good is done by carefully graduated exercise, which promotes a regulated auto-inoculation. The food must be nourishing and varied, and ample in quantity, systematic overfeeding, indeed, being advocated by many. Everything must be done to combat the very common anorexia and dyspepsia.

Medicinal Treatment is (a) *General.*—Creosote or guaiacol, cod-liver oil, and tonics, such as the hypophosphites and arsenic, are the principal remedies. (b) *Symptomatic.*—The following symptoms call for special treatment:—(1) The *cough.*—As this is a persistent and constant feature of the disease, avoid rushing at once to cough mixtures. A common exciting cause of the nightly cough is the changing from a warm room to a cold bedroom; or again, tickling of the fauces by the uvula. A useful combination is that of morphine, spirits of chloroform, and dilute hydrocyanic acid. For laryngeal and bronchial irritation, inhalations of tincture of benzoin or creosote are of much value. (2) The *night-sweats.*—Picrotoxin, aromatic sulphuric acid, atropine, and oxide of zinc are the favorite remedies. Atropine gr. 1/100 to 1/80 in pill at night, is the most reliable. (3) The *diarrhea* is usually best controlled by mineral astringents, in combination with opium. (4) *Fever* should be treated by rest, fresh air, quinine, and cold sponging, or, if need be, the cold bath. Antipyrin, etc., may be occasionally used. *Hemoptysis* demands rest in bed, quiet, light food given cold, ice to suck, injections of morphine and atropine or inhalation of nitrite of amyl." (Wheeler and Jack's *Handbook of Medicine.*)

7. LOBAR PNEUMONIA. "*The first stage* is characterized by sudden onset with chill, a sharp pain in the side, rise of temperature, a short and sharp cough, rusty-colored, viscid sputum, and dyspnea. There may be headache, insomnia, scanty urine with diminution of urea, chlorides, phosphates, and sulphates, insomnia, and herpetic vesicles on the face, and there is always an increase in the number of leucocytes in the blood. Physical examination will reveal diminished expansion, impairment of the normal percussion note, feeble or suppressed respiratory murmur, moist or dry râles, crepitation, and sometimes a pleural friction sound.

In the second stage the dyspnea is more marked; the face is more or less livid in color; the temperature is

high (104°-105° F.); and the pulse increases in rate (110-120), its tension and fullness lessening with the progress of the disease, and growing feeble and intermittent. Headache, delirium, and various other nervous symptoms may be present. Expansion is diminished and vocal fremitus is exaggerated upon the affected side. There is dullness with increased resistance over the consolidated lung, and auscultation detects bronchophony or bronchial breathing over this same area.

The third stage is ushered in by a sudden drop of temperature on or about the fifth or ninth day, followed by a natural sleep, free sweating, and relief from suffering. In this stage the subcrepitant râle (râle redux) is heard in the midst of the bronchial breathing, together with numerous moist râles. Dullness may persist for some time, but usually by the twelfth or fourteenth day the lung has returned to its normal state."

Treatment: "Consists in rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet-pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnœa and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease." (*Pocket Cyclopedia.*)

8. *Acute myelitis* is generally of rapid onset, the feet and legs become heavy and numb, twitching and convulsions may occur, the flexors are more affected than the extensors, walking is difficult, paraplegia develops, there is usually some fever, there may be girdle sensation at the level of the lesions, anesthesia of bladder and rectum are common, the reflexes will be absent if the lesion extends completely across the cord, priapism is common.

In *multiple neuritis* the onset is slower, the sphincters are rarely involved, the sensory disturbances are more severe, the extensors are more involved than the flexors, atrophy of the affected muscles rapidly supervenes, the mental condition is frequently affected.

9. *Indications of cerebral syphilis:* Headache, usually worse at night; insomnia; vertigo; hemiplegia, and aphasia; tendency to improvement and relapse; there may be paralysis or unconsciousness, optic neuritis. The diagnosis is made by a Wassermann reaction, which must be positive.

Treatment consists of inunctions of mercury (either the ointment or the oleate) or intramuscular injection of a mercurial salt; potassium iodide, either alone or in combination with mercury; sulphur baths are said to aid the elimination of the mercury from the system. Small doses of salvarsan have been recommended by some.

10. "*The treatment of acute articular rheumatism* consists in rest of the parts, and the patient should lie between blankets. The joints should be enveloped in soft wool or flannel. Restricted diet is essential. Fractional doses of calomel (gr. ¼ every hour for 6 hours) should be administered, followed by a saline purgative. Salicylic acid or its derivatives may be given in full doses, and diuretics are especially indicated. Hyperpyrexia may be controlled by phenacetine (gr. 5.). During the convalescence, tonics are of decided advantage. Locally, lead-water and laudanum or belladonna liniment may be used. The diet should be carefully regulated." (*Pocket Cyclopedia.*)

DERMATOLOGY, SYPHILOLOGY, AND DISEASES OF EYE, EAR, NOSE, AND THROAT.

1. *Psoriasis* "is a common chronic inflammatory disease of the skin, characterized by variously sized lesions, having red bases, covered with white scales resembling mother-of-pearl. It affects by preference the extensor surface of the body. The lesions are infiltrated, elevated, clearly defined, covered with white, shining, easily detachable scales which, upon removal, reveal a red, punctate, bleeding surface. The eruption is absolutely dry, and itching is usually absent."

"*The treatment* consists of the internal administration of arsenic, cod-liver oil, oil of copaiba, or potassium iodide, and the use of local applications. The scales should be removed by soap and water, alkaline baths, or oily substances. Ointments containing salicylic acid (3 per cent. to 10 per cent.), tar (ʒ 1 to ʒ 1 of ointment), ichthyol (ʒ 1 to ʒ 1), chrysarobin (gr. 20 or 30 to ʒ 1), ammoniated mercury (gr. 15 or 20 to ʒ 1), etc., are very beneficial, and should be used after the scales have been removed." (*Pocket Cyclopedia.*)

2. Pruritus ani is a frequent sign of hemorrhoids,

diabetes mellitus, thread-worms, and fissure of the anus.

3. A patient may be considered cured of gonorrhœa in the continued absence of discharge, gonococci, and shreds.

4. *Signs and symptoms of congenital syphilis.*—Impeded breathing, snuffles, necrosis of nasal bones, erythematous rash on buttocks, general atrophy with a wizened "old man" appearance, fissures of lips and angles of mouth, mucous patches in the mouth, condylomata, hemorrhages under the skin, onychia, enlargement of spleen, prominent forehead, Hutchinson teeth, interstitial keratitis, periostitis, and gummata of the internal organs.

5. *Treatment of syphilis.*—Intravenous or intramuscular injection of Salvarsan in dose of 0.5 gram, to be repeated twice at intervals of a fortnight. Intramuscular injection of calomel or administration of mercury with chalk by mouth. Iodide of sodium or potassium must also be administered during the second year. This may be combined with the mercury by the administration of the protiodide of mercury. Sometimes mercury may be given by inunction. The patient must have his teeth attended to, use a mild antiseptic mouth-wash, and should give up alcohol and tobacco. Calomel or iodoform may be used as a dusting powder for the chancre.

6. *The dangers of acute suppurative inflammation of the middle ear* are: Chronic purulent otitis media, perforation of ear drum, boils of external auditory meatus, ankylosis or necrosis of ossicles, mastoiditis, facial paralysis, meningitis, thrombosis of lateral sinus, abscess of brain or cerebellum.

7. *Trachoma* is an inflammatory condition of the conjunctiva, accompanied by hypertrophy, granule formation, and subsequent cicatricial changes.

Etiology.—It is caused by contagion from another eye, being transferred by means of the secretion.

Treatment "consists in an attempt to reduce the inflammatory symptoms and secretion, and to check and remove hypertrophy of the conjunctiva, thus shortening the duration and diminishing the liability to conjunctival cicatrization and to sequelæ. This is accomplished either by the use of certain irritating applications or by mechanical (surgical) means.

Irritating applications.—Sulphate of copper in the form of a crystal or pencil is the favorite local application. Nitrate of silver (1 or 2 per cent. solution), glycerole of tannin (5 to 25 per cent.), and the alum stick are also employed.

Mechanical (surgical) treatment includes expression,

grattage, excision, curetting, electrolysis, *x*-rays, and galvanocautery." (May's *Diseases of the Eye.*)

8. *Tuberculous laryngitis* is generally secondary to pulmonary tuberculosis. The mucosa of the larynx is swollen, and small tubercles may be found on the vocal cords. The tuberculous masses caseate and ulcerate; the pharynx, epiglottis, and trachea may become involved by extension. The signs and symptoms are those of the primary tuberculosis, with the addition of hoarseness, dyspnea, and dysphagia.

9. *Acute suppurative inflammation of the frontal sinus* is treated by opening the sinus by an incision along the inner part of the eyebrow, and then by trephining and curetting the wall of the cavity; the infundibulum is enlarged, and a drainage tube inserted for a few days; the cavity is then washed out daily, through the nose, till all discharge has ceased.

10. *Nasal polypi*, if mucous, are to be removed by a wire snare; if they recur, the bone should be curetted; if there is much bleeding, the nasal cavity is to be packed with gauze for twenty-four hours. In case of fibrous polypi these must be scraped away; but treatment is only possible in the early stage.

OBSTETRICS.

1. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of a fetus toward the end of pregnancy; (6) hydatidiform mole; (7) habitually large fetal head.

2. *Positive signs of pregnancy:* (1) Hearing the fetal heart sound; (2) active movement of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation; and (5) the umbilical or funic souffle. *Doubtful signs of pregnancy:* (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4) uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness. *Subjective signs of pregnancy*, in the order of their appearance, are: Cessation of menstruation, morning sickness, increased frequency of urination, active fetal movemets. *Objective signs of pregnancy*, in the order of their appearance, are: Softening of the cervix, changes in the mammary glands, discoloration of the vulva and vagina, pulsation in the vaginal vault, Hegar's sign, active fetal movements, ballottement, palpation of the fetus, intermittent

uterine contractions, hearing the fetal heartbeat, rate of growth of the uterine tumor.

3. *Symptoms of death of the fetus* during the later months of pregnancy are: Cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements cease, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete milk. If the fetus has been dead for some time crepitus of its cranial bones may be elicited.

4. *Curettage is indicated:* (1) For removal of placental débris (2) in hemorrhagic endometritis, (3) in some forms of dysmenorrhea (membranous), (4) for diagnostic purposes, (5) in some cases of puerperal sepsis, (6) sometimes to check hemorrhage, due to fibroids. *Contraindications:* (1) The least suspicion of even the possibility of pregnancy; (2) menstruation; (3) acute endometritis; (4) malignant disease of the uterus or vagina; (4) acute pelvic inflammation.

Technique.—All antiseptic and aseptic precautions are necessary, the patient should be in the dorsal position, the vagina is to be disinfected, and the cervical canal dilated; a speculum is introduced into the vagina and the cervix is drawn down with volsella; the uterine cavity is irrigated with creolin or lysol; a curette is inserted to the fundus and moved down to the internal os; the operator should begin at one cornu and go in the same direction all around till he reaches the starting point, and if necessary repeat till no more spongy or hyperplastic tissue appears; the fundus should be scraped separately by moving the curette along it from side to side; in going toward the fundus no scraping should be done, and care must be taken not to perforate the uterus; should this happen no fluid must be injected; otherwise the uterus and vagina are again irrigated, and one or more strips of iodoform gauze are inserted into the cavity to act either as a hemostatic plug or as a drain, which is diminished with two days' interval and withdrawn on the sixth day. A hemostatic tampon should be placed in the vagina and withdrawn the following day. If any fever arises, the tampon is at once removed and the vagina douched with antiseptic fluid every three hours. If not, the vagina is only swabbed with the same every day, and packed loosely with iodoform gauze. After the final removal of the gauze the antiseptic douche is given twice a day until there is no more discharge. The patient should remain in bed for a week.

5. Labor is divided into three stages: The *first stage*

begins with the commencement of labor, and ends with the complete dilatation of the os uteri. The *second stage* begins with the complete dilatation of the os uteri, and ends with the birth of the child. The *third stage* immediately follows the second, and ends with the expulsion of the placenta and the beginning contraction of the uterus.

In the *third stage of labor* the physician should seize the fundus of the uterus through the abdominal wall and knead and rub it until it contracts vigorously; then he should press it down in the direction of the axis of the pelvic inlet. This should last for about a quarter of an hour after the child is born. The placenta, after it is expressed, should be carefully taken by the physician so as to be sure that it is *all* expelled; at the same time care must be taken that no particle of membrane remains behind. Fluidextract of ergot may be administered. The *dangers* are: hemorrhage; retained placenta or clots or pieces of the membranes and sepsis.

SURGERY.

1. *Shock* is the name given to a sudden and general depression of the vital powers; due to some strong stimulation (such as injury or emotion), acting on the vital centers in the medulla and producing vasomotor paralysis. Shock is *primary* when the symptoms appear promptly; it is *secondary* when the symptoms don't appear for several hours (often observed after railway accidents, intoxication, etc.)

Symptoms of shock.—The blood pressure is lowered considerably; the pulse is very compressible, rapid, short, and often difficult to count; the respirations are quick, sighing, and irregular; the skin is cold, clammy, and pale; perspiration may be profuse, but other secretions are diminished; body temperature is subnormal; muscles are relaxed; and reflexes are diminished.

Treatment.—Place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermically, may be necessary for the relief of pain. Adrenalin solution is administered into the arterial system.

In surgical operations *shock may be largely prevented* by reassuring nervous patients, keeping the patient warm, the avoidance of the excessive catharsis, and semi-starvation that often prevails before operation, the administration of strychnine and atropine before operation, the avoidance of delay and undue handling of parts during the operation, prompt checking of hemorrhage, and by using the utmost gentleness.

2. *Acute suppurative appendicitis* begins suddenly with pain about the umbilicus or right iliac fossa, vomiting, constipation, and slight fever. There is some tenderness at or about McBurney's point, a spot at the junction of the outer and middle thirds of a line joining the umbilicus and anterior superior iliac spine, and rigidity of the right rectus muscle.

A well-marked swelling is usually present, and the pulse steadily increases in frequency. There is also a steadily-increasing leucocytosis. A persistently high temperature, or a subnormal temperature with an increasing pulse-rate, are strong indications as to the presence of pus. Three terminations may occur: 1. The attack may subside, leaving the pus shut up. 2. The abscess may point and discharge itself into the bowel or on the surface, or it may track upward along or behind the colon, and form a subphrenic abscess. 3. The localized abscess may burst and cause general peritonitis. The rectum should always be examined, as a collection of pus may be felt in Douglas's pouch.—(From *Aids to Surgery.*)

Diagnosis.—This is made by the sudden and severe abdominal pain, unilateral rigidity of lower part of abdominal wall, tenderness over McBurney's point, with nausea, vomiting, fever, and leucocytosis.

In *distended gall-bladder.*—The pain is more severe and sudden, and is in the region of the liver; it radiates to the right scapula and toward the umbilicus; chills and sweats are common; also vomiting, and sometimes symptoms of collapse and jaundice; all the symptoms come on more suddenly. In *gallstone colic.*—The pain is excruciating and is in the region of the liver; it radiates to the right scapula and toward the umbilicus chills and sweats are common also vomiting, and sometimes symptoms of collapse and jaundice; calculi may be found in the feces. In *ulcer of the pylorus*, the pain is in the epigastric region, may radiate to the left shoulder, and is increased by taking food (usually about one to three hours after a meal); vomiting may occur from one to four hours after eating; hemorrhage may be present; the acidity of the gastric contents is above normal, owing to excess of free hydrochloric acid. In *renal colic.*—The pain is in the region of the affected kidney; it radiates down the thigh; there are intense rigors, retraction of the testicle may be present, also history of previous attacks or of calculi; the urine may be scanty, suppressed, or bloody. In *acute peritonitis.*—Both thighs are flexed, pain and tenderness are more general and are increased by movement, vomiting is

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ery, and contains bacilli. Around it are arranged layers of epithelioid cells. Beyond these are collected many leucocytes, which merge through granulation tissue into the normal structures. The structure is not so typical in all cases, as giant cells may be absent. No blood vessels are present in tubercles, and the surrounding vessels are narrowed or obliterated by endarteritis."

Results.—"(1) *Caseation* is a result of progressive action of the bacilli. Two factors contribute to this: (1) The destructive action of the bacillus; (2) the defective blood supply from endarteritis. The center of each tubercle softens and becomes yellow or caseous. Neighboring tubercles after caseating coalesce, and a tuberculous abscess is formed and in its walls further miliary tubercles are found. (2) *Retrogressive changes.* —The resistance of the tissues is considerable, and if circumstances are favorable the bacilli are destroyed or their growth inhibited and retrogressive changes occur. The tubercle may be converted into fibrous tissue, and only a cicatrix remains; or the caseous matter may become encapsuled, and perhaps resume activity at some later date, if the capsule is ruptured by some injury. Sometimes calcification occurs. (3) *Diffusion* is a marked feature. This may be (1) local, by direct extension; (2) to distant viscera, by minute emboli; (3) acute general tuberculosis may occur in any case. Tubercles are scattered throughout the body, and the disease is fatal in a few weeks."—(*Aids to Surgery.*)

4. *Method of preparing vaccine.*—"(1) The causal organism (in this case the *Staphylococcus pyogenes*) is obtained from the seat of the lesion and isolated in pure culture at 37° C. on a suitable medium such as agar. (2) The culture growth is emulsified in about 5 c.c. of a 0.9 to 1.0 sodium chloride solution. (3) The bacterial emulsion is transferred to a water bath or incubator, and kept at 60° C. for from thirty to sixty minutes. (4) The number of bacteria in the emulsion is estimated. (5) The vaccine is diluted with normal saline solution until each cubic centimeter contains an appropriate number of organisms for the dose, *e.g.* 10 millions, 100 millions, 1,000 millions, etc. (6) The sterility of the emulsion is proved and a small amount of antiseptic, *e.g.* phenol 0.5 per cent. or tricresol 0.25 per cent., is added, and the vaccine is filled into sterile bulbs for use. In practice the bulb is opened, the contents are filled into a sterile syringe, preferably all glass, and the vaccine is injected subcutaneously under strict aseptic precautions."—(Bruce's *Materia Medica and Therapeutics.*)

5. The *physician* should wear a gown while with the patient, should inspect the patient's eyes, nose, and throat through a pane of glass so that the patient may not cough in his face, and should carefully wash his hands in an antiseptic solution before leaving. The *patient* should be isolated, and the nose, throat, and mouth should be washed with an antiseptic solution; diphtheria antitoxin should be administered as early as possible. The *family* should be kept away from the patient, and all infected articles should be soaked in a solution of corrosive sublimate or carbolic acid. The *community* is protected by the above procedure; but, in addition, the disease should be reported to the proper health authorities, other children from the family should not be allowed to go to school or church or other public places, strict quarantine must be observed, and there must be a thorough disinfection at the close of the case.

PRACTICE.

1. *Symptoms of uremia.*—Headache, insomnia, convulsions, vomiting, delirium, dyspnea, amaurosis, and coma. Uremia may be suspected from the presence of nephritis, a urinous odor of the breath, scanty urine, and increased arterial tension.

The patient should be put to bed; croton oil (1 minim) may be administered; vensection and dry cupping over the kidneys may be tried; diaphoretics are useful.

2. *Endocarditis* is apt to occur during or following rheumatism and scarlet fever. The signs and symptoms may be negative; but there is generally some alteration in the character of the heart sounds, and dilatation of the heart may be present; the pulse rate is often increased. The sounds heard depend upon the valve affected, and since the mitral valve is the one most commonly involved there is apt to be a systolic murmur heard best at the apex and transmitted to the left axilla.

3. *Symptoms of cancer of liver.*—Pain, tenderness, and a sense of weight in the hepatic region; emaciation and weakness; cachexia; jaundice, vomiting, and fever.

4. The case is one of cardiac decompensation, following endocarditis (which may have been due to rheumatism, scarlet fever, or some other infection). The prognosis of endocarditis is good so long as compensation is maintained; but is unfavorable when compensation is ruptured.

5. In a case of alleged hematemesis other possible sources of the blood are: The blood may have been swallowed (as in epistaxis, after tonsillectomy, pulmonary hemorrhage). The main question is to differentiate between *hematemesis and hemoptysis:*

A modified traction splint may be made of plaster of Paris. Differences of opinion exist as to when the abscesses should be incised, but always the strictest asepsis or antisepsis is necessary. Irrigation of the cavities with sterile water, boric acid solution, or mercuric chloride solution, 1:4000, and the injection of sterile iodoform oil, 5 to 10 per cent., are commonly resorted to. Osteotomy and fixation may be required for the deformity arising as a complication. The surgical treatment consists of aspiration, incision, erasion, and excision."—(*Pocket Cyclopedia of Medicine and Surgery.*)

5. GUNSHOT WOUNDS. Regarding *probing*, Da Costa says:—"The surgeon must not feel it his duty to probe in all cases. In many cases it is better not to probe at all. Explore for the ball when sure that it has carried with it foreign bodies; when its presence at the point of lodgment interferes with repair; when it is in or near a vital region (as the brain); and when it is necessary to know the position of the bullet in order to determine the question of amputation or resection. If the wound is large enough the finger is the best probe."

Regarding *immediate operation*, there is difference of opinion, some authorities holding that unless the bullet causes definite symptoms it should be let alone; others advocate its removal to relieve the mind of the patient and to obviate possible complications later on.

Gunshot wound of the knee should be treated conservatively, if possible; the wound should not be explored except to remove foreign bodies, loose fragments, etc. Incision may be necessary for such removal. The joint is irrigated with a weak antiseptic solution, drained, dressed, and immobilized. Suppuration calls for incision and drainage. If there is extensive laceration of tissue with much splintering of bone and interference with blood and nerve supply the condition may call for amputation.

STATE BOARD EXAMINATION QUESTIONS.

OKLAHOMA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Discuss briefly the skin and its appendages.
2. Name and locate the various serous membranes.
3. Discuss the vocal cords.
4. Give boundaries of the pelvis.
5. Where would you make the spinal puncture in treatment of cerebrospinal meningitis?
6. Discuss the hip joint; nerve, blood supply, etc.

7. Discuss one of the vertebrae.
8. Discuss the action of the following muscles: Flexor profundus digitorum; Brachialis anticus; Psoas magnus.
9. What vessels, nerves, and other structures are located in Scarpa's triangle?
10. Give histology of prostate gland.

PHYSIOLOGY.

1. What are the functions of the spinal cord?
2. What is the origin of urea and of uric acid?
3. Describe the vasomotor nervous system and explain its functions. Where is the vasomotor center located?
4. Give the functions of the suprarenal glands.
5. What kind of membrane lines the mastoid cells and why?
6. Explain the portal circulation.
7. What are the functions of bile? Give its constituents.
8. Describe the pleuræ, giving kind of tissue and functions.
9. Give functions of cerebellum. What is the result of extirpation.
10. Give the functions of the medulla oblongata. Name the "centers" located in the bulb.

MATERIA MEDICA.

1. What is the antidote for strychnine?
2. Mention the principal uses of adrenalin.
3. Give the treatment of a case of opium poisoning.
4. Give the common name, therapeutic uses, and dose of sodium sulphate.
5. Describe the therapeutic uses of jalap and state how it differs in effect from aloes.
6. What effect has pilocarpus on (*a*) the heart; (*b*) the skin; (*c*) the salivary glands?
7. How do potassium acetate and potassium bitartrate compare as diuretics and purgatives?
8. What action on the heart has valerian in full doses? State the therapeutic uses of valerian.
9. What is heroin? Describe its physical properties and physiological action. Give some indications for its use.
10. Name three drugs used to arrest hemorrhage from the lungs and explain how they accomplish the result.

CHEMISTRY.

1. State the occurrence of phosphorus in nature and antidotes in case of poisoning from phosphorous.

2. What are proteins and what elements do they contain?
3. What is ptyalin and what action characterizes it?
4. In examining the urine of primiparæ and multiparæ, what would you especially examine for in the sample?
5. Name the varieties of the urinary calculi.
6. Give antidotes for the following: Carbolic acid; iodine; and caustic alkalies.
7. What is the common name for trichlormethane and tri-iodide of methane?
8. What metallic element is constantly present in the coloring matter of the blood, and what element is present in all acids?
9. What are alkaloids?
10. $2NaNO_3 + H_2SO_4$ equals what?

BACTERIOLOGY AND PATHOLOGY.

1. What do you understand by immunity? How obtained?
2. Differentiate morphologically the following microorganisms: Diphtheria bacillus and typhoid bacillus; gonococci and *Diplococcus meningitidis intracellularis*
3. Give bacteriological manifestation in typhoid fever.
4. Discuss serum-therapy in treatment of diphtheria.
5. What do you understand by the term anaphylaxis?
6. Define inflammation, infection, intoxication.
7. Describe the inflammatory reaction in vascular tissues.
8. Define cholangitis and give its pathology.
9. Give pathology of acute pelvic peritonitis.
10. Classify tumors. Give name of one in each class. Describe one tumor of the three named.

PHYSICAL DIAGNOSIS.

1. Where do you feel for the pulse and why, and what points are noted?
2. What is the rate of pulse in the adult male and in the female?
3. How many periods may we discriminate in the prognosis of a case of valvular disease of the heart?
4. Describe the failure of compensation.
5. Name the physical signs of acute dilatation of the heart.
6. Name the rales in acute bronchitis (or bronchopneumonia).
7. Diagnose a moderately advanced case of phthisis.
8. Describe in your own way a case of hydrocephalus.
9. What do retinal hemorrhages indicate?
10. Diagnose syphilitic heart disease.

OKLAHOMA.

PRACTICE.

1. Give the physical signs of pleuritic effusion.
2. How may pleuritic friction be distinguished from rales occurring in bronchial tubes?
3. Give the physical signs in most usual valvular lesions of the heart.
4. Name five diseases caused by a known germ.
5. Name places where yellow fever is known to be endemic.
6. On what symptoms would you base a diagnosis of typhoid fever?
7. Define rubeola and describe its symptoms.
8. Give the treatment of whooping cough.
9. Differentiate between acute articular rheumatism and periostitis.
10. Describe the Wassermann reaction for the serum diagnosis of syphillis.

HYGIENE.

1. Mention six desirable factors in the location of a resort for consumptives.
2. Define Hygiene.
3. What hygienic measures should be employed by persons prone to "catch cold"?
4. Differentiate between endemic and epidemic diseases.
5. How does the hookworm usually enter the human body? What measures would you employ to prevent its spread?
6. What are the most common sources of infection of diphtheria?
7. Describe the most approved method of performing vaccination, and relate the complications that may occur as results of faulty methods.
8. How can malarial districts be made healthy?
9. What habits of school children tend to produce myopia?
10. Give the dimensions of a sanitary school room necessary for fifty pupils.

OBSTETRICS AND GYNECOLOGY.

1. Define the fetal circulation.
2. Name the three embryonic layers. From which is the skin produced? The bones?
3. Give etiology and treatment of puerperal infection. Of puerperal eclampsia.
4. Name the contents of your obstetrical bag. What is pituitrin and when should it be used?

5. Differentiate the indications for pubiotomy, craniotomy, and cesarean section.
6. Give the anatomy of the uterus and appendages.
7. Under what conditions is curettage indicated?
8-9. Define and give etiology, prognosis, and treatment of amenorrhea, dysmenorrhea, retroflexion, retroversion, rectocele, cystocele, pyosalpingitis, and endometritis.
10. Give etiology, diagnosis, prognosis, and treatment of gonorrhea in the female.

SURGERY.

1. Discuss the tonsil surgically: (*a*) Anatomy; (*b*) Infections; (*c*) Pathology; (*d*) Treatment, including operative technique.
2. Give description, etiology, and treatment of pterygium.
3. Give three dressings suitable for fracture of clavicle.
4. In fracture of middle of humerus what nerve may be injured? Give localization of symptoms leading to diagnosis of nerve injury.
5. Name two inflammatory diseases of the skin and give treatment.
6. Differentiate chancre and chancroid. Give treatment for chancroid.
7. In non-operative treatment of acute appendicitis give the salient points advocated by Ochsner, Murphy and Fowler.
8. How would you treat a severe lacerated, contused wound of hand not requiring amputation?
9. Discuss briefly the value of radiography in surgical diagnosis and treatment.
10. Give treatment for gunshot wound of chest; of abdomen.

TOXICOLOGY AND MEDICAL JURISPRUDENCE.

1. Give the differential diagnosis between strychnine poisoning and tetanic convulsions.
2. Name two drugs that, given in lethal doses, will produce convulsions, and give antidote.
3. Mention the antidote in the case of poisoning from silver nitrate. How does the antidote act?
4. Discuss briefly the symptoms of cocaine poisoning.
5. Name the antidote for alkaloids. How does it act?
6. Define Medical Jurisprudence.
7. Differentiate between burns inflicted during life and after death.
8. When is it legally permitted to produce abortion?

9. For what reasons may a physician refuse to give expert testimony?
10. Define expert testimony.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

OKLAHOMA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The skin consists of (1) epidermis, and (2) dermis. The appendages are the sweat glands, sebaceous glands, hair, and nails.

"The *epidermis* is made up of three principal layers: (*a*) the horny layer, or *Stratum corneum*, is the most superficial, and consists of layers of flattened cells, which are dry and horny without any nucleus; (*b*) the *Stratum lucidum*, composed of several layers of nucleated cells, which are more or less indistinct, and in section appear as an almost homogeneous layer; (*c*) the *Rete mucosum* or Malpighian layer contains, in its upper part, layers of 'prickle' cells, and its inferior layer consists of a single stratum of columnar cells. Pigment is principally found in the lowest layer.

"The *dermis*, or true skin, is made up of an interlacing network of connective tissue, formed of white fibrous tissue, yellow elastic tissue, corpuscles, vessels, and nerves. In some parts of the body, as in the skin of the scrotum, perineum, penis, the cutis vera contains unstriated muscular fibers. There are also small muscular fibers in connection with the hair follicles. Beneath the skin the subcutaneous tissues contain abundant adipose tissue."—(Ashby's *Notes on Physiology*.)

The *sweat glands* are invaginated epithelial tubes which are situated in the dermis and in the subcutaneous fatty tissue. The largest of these glands occur in the axilla and the groin.

The *sebaceous glands* are found wherever hairs occur, and they usually open into the hair follicles. They also occur on the external genitals and in the eyelids.

Hairs consist of a root which is embedded in the skin, and a shaft or stem which projects beyond the surface of the body. The root is contained in an invaginated tube of skin called a follicle. The medulla, or pith, of the hair consists of polyhedral cells and air spaces. The follicle consists of outer and inner root sheath, Henle's layer, Huxley's layer, hyaline layer and cuticle.

Nails consist of a body, free edge, root, and borders. The nail bed is the Malpighian layer of the skin.

2. The *serous membranes* are: (1) *Peritoneum*, lining the abdominal cavity; (2) *pleuræ*, covering the lungs; (3) *pericardium*, surrounding the heart; (4) *tunica vaginalis*, investing the testicles; (5) capsule of Tenon, in connection with the eyeball; (6) the lining membrane of the cavity of the cerebrospinal axis. Sometimes the lining membrane of the heart, lymphatics and blood-vessels is considered as a serous membrane.

3. The *vocal cords* are fibrous bands covered with mucous membrane, and situated inside the larynx. The two true vocal cords are attached in front to the angle between the *alæ* of the thyroid cartilage, and behind to the anterior tubercles at the base of the arytenoid cartilages. Their free edges are directed upwards. The two false vocal cords are situated above the true vocal cords.

4. The *false pelvis is bounded* on either side by the ilium; in front it is incomplete, having a wide gap between the anterior borders of the ilia; this is filled in (in the recent state) by the anterior abdominal walls; behind there is a notch between the ilia and the base of the sacrum.

The *true pelvis is bounded* in front and below by the symphysis pubis and the superior rami of the pubes; above and behind, by the sacrum and coccyx; laterally by the ischium and ilium.

5. Spinal puncture should be made in the space between the third and fourth lumbar vertebræ; a line drawn connecting the highest points of the iliac crests passes through the spine of the fourth lumbar vertebra. The puncture is to be made in the first interspace above this line, and a little to one side of the median line.

6. The *hip joint* is an enarthrodial joint, formed by the head of the femur and the acetabulum. The articular surfaces are covered with cartilage. Near the center of the head of the femur is attached the ligamentum teres. The *ligaments* are: (1) The capsular, which embraces the margin of the acetabulum above, and the neck of the femur below. (2) The iliofemoral or Y ligament, which passes obliquely across the front of the joint, and is attached above to the anterior inferior spine of the ilium, and below to the anterior intertrochanteric line. (3) The ligamentum teres. (4) The cotyloid ligament, which deepens the acetabulum, and bridges over the cotyloid notch, being there called (5) the transverse ligament. The joint has a very ex-

tensive synovial membrane. It is capable of the following movements: Flexion, extension, abduction, adduction, circumduction, and rotation. The *arterial supply* is from the obturator, circumflex (of femoral) and superior and inferior gluteal arteries. The *nerve supply* is from the sacral plexus, sciatic, obturator and accessory obturator nerves.

7. *The fourth cervical vertebra* has a small, transversely elongated body, with no facets for ribs; the laminæ are long and slender; the spinous process is short, nearly horizontal, and bifid; the transverse processes are short, and contain a foramen for the vertebral artery; the superior articular process is directed upward and slightly backward; the inferior articular process is directed downward and slightly forward; the spinal foramen is large and triangular.

8. *Flexor profundus digitorum* flexes the phalanges. *Brachialis anticus* flexes the forearm; and, if the forearm is fixed, it flexes the arm upon the forearm.

Psoas magnus flexes the thigh upon the pelvis, and bends the lumbar part of the vertebral column forward and to its own side; it helps to maintain the body in the erect position.

9. *Contents of Scarpa's triangle:* The femoral vessels pass from about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it, is the crural branch of the genitocrural nerve. At the apex, the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics.

10. *Structure of prostate.* "The prostate is a compound tubulo-alveolar gland whose ducts open into the prostate portion of the urethra. Smooth muscle fibers not only surround the organ, but interlace radially toward its center, forming a network in whose meshes the glandular parts are located. Areolar tissue and blood-vessels accompany the muscle tissue. The alveoli of the glands are lined by simple columnar epithelium, which sometimes show two rows of nuclei. These alveoli contain a serous acid coagulum, and usually oval laminated concretions called *prostatic bodies.* The lat-

ter are more numerous in old men. The numerous excretory ducts unite to form twelve to fifteen collecting tubes which open into the urethra, most of them into the *prostatic sinus*. These ducts are lined by simple columnar epithelium, except near their terminations, where it is transitional. The organ dorsal or in front of the urethra is mostly smooth muscle tissue." (Hill's *Histology*.)

PHYSIOLOGY.

1. *The functions of the spinal cord* are: (1) The conduction of nerve impulses; (2) reflex action; (3) coordination; it also contains special centers which preside over definite functions.

In the spinal cord: (*a*) The white substance simply conducts nerve impulses; (*b*) the gray substance contains groups of cells which act as centers for and distributors of nerve impulses, and are also concerned in reflexes; (*c*) the anterior cornua have a motor and trophic function; (*d*) the posterior cornua are sensory.

2. "The greater part of the *urea* produced in the body is formed in the liver. The liver cells form the urea from two sources: (1) The larger amount, produced by the liver cells, is derived from the aminoacids which have been absorbed from the small intestine, and which are not required by the tissues; this constitutes the *exogenous urea*. (2) The smaller amount, produced by the liver cells, is derived from the ammonium carbonate, which is derived from the tissues; some is also produced by the action of the uricolytic enzyme upon uric acid; this constitutes the *endogenous urea*." (Lyle's *Physiology*.)

Uric acid: "In man, uric acid has a twofold origin; one portion, coming from the breaking down of the nuclein-containing tissues or cell elements of the man's own body, and hence is of endogenous origin, while the other portion—usually the larger—is of exogenous origin, coming from the transformation of free and combined purin compounds present in the food."—(Chittenden.)

3. The vasomotor nervous system consists of (1) a vasomotor center in the bulb, (2) of some subsidiary centers in the spinal cord, and (3) of vasomotor nerves, which are of two kinds: (*a*) those causing constriction of the vessels, and so-called vasoconstrictor nerves; and (*b*) those causing dilatation of the vessels, and so-called vasodilator nerves. These nerves supply the muscle tissue in the walls of the blood-vessels and regulate their caliber, thus influencing the *quantity* of

blood supplied to a part; at the same time they regulate the *quality* of blood supplied to a part; they also regulate the *nutrition* of a part, also *secretion* and *heat production*. They are concerned, too, in the control of the heart-beat. The center is in the medulla, in the floor of the fourth ventricle, near the calamus scriptorius.

4. The active principle of the suprarenal gland is adrenalin or suprarenin. Its function is to keep up the blood pressure by stimulation of the ends of the vasomotor nerves; an exception to this is the vasomotor nerve of the kidneys; its action here is to dilate the kidney arterioles and so produce diuresis. The secretion from the cortical portion of the gland helps to maintain general body strength and nutrition; it also has some influence on the growth and development of the body; it may also help to destroy toxins. It stimulates the heart, dilates the coronary vessels, inhibits the movement of the intestines, and may cause sweating, dilatation of the pupils, and erection of the hairs.

5. The mastoid cells are lined with mucous membrane continuous with that of the mastoid antrum and the tympanum.

6. *The portal system.* The veins of the portal system collect the blood from the digestive tract. They form a trunk, the *vena portæ*, which enters the liver and breaks up into small branches in its substance. The following veins form the portal system: The inferior mesenteric, superior mesenteric, splenic and gastric.

The *portal vein* is formed by the union of the splenic and superior mesenteric veins in front of the right crus of diaphragm and inferior vena cava, and behind the neck of the pancreas. Passes up behind the first part of duodenum and then between the layers of the small omentum, behind and between the common bile-duct and hepatic artery, the duct being placed on the right and artery on the left, to transverse fissure of liver, where it divides into right and left branches to corresponding lobes, and also gives an offset to the Spigelian lobe. Connected with the branch to the left lobe are in front the *obliterated umbilical vein* and behind the *ductus venosus*, the remains of a fetal connection with the inferior vena cava.—(*Aids to Anatomy.*)

7. BILE. *Functions:* (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote per-

istalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach, and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action. *Composition:* Water, sodium glycocholate, sodium taurocholate, lecithin, cholesterin, pigment, and inorganic salts.

8. The *pleuræ* are two serous sacs enclosing and investing the lungs. Each pleura consists of a visceral and parietal layer. The *visceral* portion covers the lungs, and the *parietal* layer lines the inner surface of the chest walls, the upper surface of the diaphragm, and the sides of the pericardium. The visceral and parietal layers of the corresponding pleura become continuous in front and behind the root of the lung; and below the root a fold, the *ligamentum latum pulmonis*, extends downward along the inner surface of the lung to the diaphragm. The mediastina are formed by the visceral layers of each side approaching one another toward the median line.

Their *function* is to prevent the friction which would otherwise occur between the lungs and the chest walls at every respiration.

9. The *functions of the cerebellum* are: Co-ordination of muscular movements, and maintenance of equilibrium.

If the cerebellum is removed there is a lack of co-ordination, and loss of equilibrium; but sensation in general is not affected.

10. The *functions of the medulla oblongata* are: (1) It is a conductor of nervous impulses or impressions from the cord to the cerebrum, from the brain to the spinal cord, also of coordinating impulses from the cerebellum to the cord; (2) it contains collections of gray matter which serve as special nerve centers for the following functions or actions: respiration, salivary secretion, mastication, sucking, deglutition, vomiting, voice, facial expression; it also contains the cardiac and vasomotor centers.

MATERIA MEDICA.

1. The chemical antidote for strychnine is potassium permanganate.

2. *Adrenalin* is used as a local vasoconstrictor, to arrest small hemorrhages, to allay itching; it has also been used in cases of shock, Addison's disease, spasmodic

bronchitis, edema of the glottis, hemoptysis, congestion and edema of the lungs, hemorrhoids, and inflamed mucous surfaces.

3. *Treatment of opium poisoning* consists in washing out the stomach, preferably with a dilute solution of potassium permanganate; ambulatory treatment to keep the patient awake; artificial respiration is indicated, and strong coffee should be administered by the mouth or rectum; the bladder should be emptied by the catheter.

4. SODIUM SULPHATE. *Common name:* Glauber's salt. *Therapeutic uses:* As a cathartic, to alkalinize the urine, as a cholagogue, and in some cases of gallstones. *Dose:* Four drams.

5. *Jalap* is used as a purgative and diuretic; in cases of dropsy, nephritis, and cerebral congestion.

Jalap takes about three hours to act; *aloes*, about eight or ten hours. *Jalap* acts chiefly on the small intestine; *aloes*, chiefly on the large intestine.

6. Action of *pilocarpus* on the *heart:* The heart is at first accelerated, then slowed; and the blood pressure first rises, then falls. On the *skin*, it causes hyperemia, sweating, elevation of temperature for a short time, but the evaporation of the sweat soon causes a fall of temperature. On the *salivary glands*, it causes an increase in the secretion of these glands.

7. Potassium acetate is the better diuretic; and potassium bitartrate is the more active purgative.

8. *Valerian*, in full doses, is said to increase the action of the heart and to produce exhilaration.

Therapeutic uses of valerian: It is used in cases of syncope, flatulence, palpitation of the heart, chorea, epilepsy, nervousness, and hysterical conditions generally.

9. *Heroine* is a derivative of morphine. It is a colorless, odorless, crystalline powder with a slightly bitter taste; it is insoluble in water, but is soluble in dilute acids. Its action is that of a sedative to the respiratory mucous membrane, and it is used chiefly for controlling cough.

10. *Three drugs to arrest hemorrhage from the lungs:* (1) *Adrenalin*, which acts as a vasoconstrictor; (2) *ergot*, which acts as a constrictor of the involuntary muscle and as a vasoconstrictor; (3) *hamamelis*, which owes its styptic properties to the tannin which it contains.

CHEMISTRY.

1. *Phosphorus* occurs only in combination; in miner-

als and vegetables, as phosphates of calcium, magnesium, sodium, potassium, aluminum and lead; in animals, as phosphates of calcium, sodium, potassium and magnesium.

There is no known chemical antidote to phosphorus; potassium permanganate is efficacious; old French oil of turpentine is said to be the physiological antidote; fixed oils or fats must not be administered.

2. *Proteins* are complex organic substances of unknown constitution and high molecular weight; they are present in all living matter. They are composed of carbon, hydrogen, oxygen and nitrogen; they may also contain sulphur, phosphorus, iron, copper, or iodine.

3. *Ptyalin* is an enzyme which is found in the saliva; it converts starch into maltose.

4. In examining the urine of pregnant women, special care should be made to ascertain the amount of urine voided, the quantity of solids excreted, the amount of urea excreted, and the presence or absence of albumin, sugar, and of casts.

5. *Varieties of urinary calculi:* Uric acid, sodium urate, ammonium urate, calcium oxalate, calcium phosphate, ammonio-magnesium phosphate, cystin, xanthin, calcium carbonate, potassium urate, calcium urate and magnesium urate.

6. *Antidote* for *carbolic acid*, sodium sulphate, alcohol; for *iodine*, starch; for *caustic alkalies*, diluted vinegar.

7. The common name of trichlormethane is chloroform; of tri-iodide of methane is iodoform.

8. *Iron* is present in the hemoglobin of the blood.

Hydrogen is present in all acids.

9. *Alkaloids* are organic, nitrogenous substances, alkaline in reaction, and capable of combining with acids (to form salts) in the same way that ammonia does.

10. $2\ NaNO_3 + H_2SO_4 = Na_2SO_4 + 2\ HNO_3$.

BACTERIOLOGY AND PATHOLOGY.

1. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic microorganisms. Immunity may be either natural or acquired.

Natural immunity is that power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired immunity is this resistance acquired (1) by a previous attack of the disease, or (2) by the person being made artificially insusceptible. The chief conditions which give immunity are: (1) A previous at-

tack of the disease; (2) inoculation with the specific microorganisms in small numbers or of diminished virulence, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

2. The bacillus of diphtheria is longer than the typhoid bacillus; the bacillus of diphtheria has a club-shaped thickening at one or both ends; the typhoid bacillus has ends which are rounded but are never club-shaped; the diphtheria bacillus has no flagella, the typhoid bacillus has flagella.

The gonococcus is of uniform size and shape, the diplococcus intracellularis meningitidis varies considerably in size and shape.

3. In *typhoid fever*, the bacilli may be found in the blood, in the rose spots, in the urine, in the feces, in the sputum, and in the gall bladder. For the *blood*, the Widal test is most commonly employed.

Widal's reaction "depends upon the fact that serum from the blood of one ill with typhoid fever, mixed with a recent culture, will cause the typhoid bacilli to lose their motility and gather in groups, the whole called 'clumping.' Three drops of the blood are taken from the well washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover glass, and this is inverted over a sterile hollow-ground slide and examined. A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps and cease their rapid movement inside of twenty minutes."—(From Thayer's *Pathology*.)

4. "*An antitoxic serum* is a blood serum containing antitoxin, produced therein by the cells of the organism as a result of the repeated injection of a toxin into the tissues of the animal from which the serum is taken."

"Diphtheria antitoxin is obtained from the horse, the animal having been rendered artificially immune by repeated injections extending over a period of several months of gradually increasing quantities of the strong-

est diphtheria toxin. As the bacilli themselves are not injected, the horse does not become infected with diphtheria, but he gradually acquires a tolerance for the toxins of the disease and develops in his blood a substance (antitoxin) which has the power to neutralize those toxins. At the proper time, when it is thought that his blood has acquired the requisite degree of potency, the animal is bled, and the serum—the part of the blood containing the antitoxin—is carefully separated from the clot, filtered and standardized. The last procedure is accomplished by determining the quantity of antitoxin serum required to offset the effects of the minimum quantity of toxin necessary to kill a guinea-pig in a definite time. The strength of the antitoxin is measured in units, a unit containing the amount of antitoxin required to save the life of a guinea-pig which has been injected with 100 fatal doses of toxin."—(Stevens' *Materia Medica.*)

5. *Anaphylaxis* is a condition of hypersusceptibility induced by the injection of a serum. It is (to some extent) the opposite of prophylaxis, and in place of rendering the person injected immune the serum renders him particularly susceptible.

6. *Inflammation* is the name given to the series of changes occurring in a part as the result of injury, provided that the injury does not at once destroy the vitality of the part.

Infection means the successful invasion of the tissues by a pathogenic microorganism.

Intoxication is the condition in which the body has absorbed the toxic products of bacteria, but the infecting microorganisms remain at the site of inoculation.

7. The phenomena of inflammation are dilatation of the arterioles, capillaries, and small veins. At first the blood current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small veins, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin or to act as food for connective tissue cells, or to act as a phagocyte, and be transformed into a pus corpuscle. Red corpuscles may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the plasma and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin.

8. "*Cholangitis* is inflammation of the bile ducts, and

is generally found in the common duct. It may, however, extend through the smaller ducts and capillaries. It is commonly secondary to inflammatory conditions in the stomach or duodenum. It may be due to bacteria entering from the intestine or to irritation by the presence of a gallstone. In the catarrhal form the mucosa becomes reddened, swollen, edematous, and covered by mucus. In the suppurative type the biliary ducts are dilated, filled with purulent material, and commonly stained with bile. The walls of the ducts are much thickened, softened, and infiltrated by pus. The mucosa is congested, edematous, covered with mucus, and in advanced cases, irregularly ulcerated. About the terminal branches of the ducts there are usually small abscesses. The liver is enlarged, swollen, softened, and opaque. The surface is irregular in consequence of the projection of many small abscesses. The cut surface shows more or less enormously dilated bile ducts filled with pus. The intervening liver tissue is the seat of marked periductal congestion, parenchymatous degeneration and necrosis."—(McConnell's *Pathology.*)

9. "*Peritonitis* is brought about by infections inflammations of neighboring tissues, particularly in septic conditions of the female genital organs, by perforations of the stomach or intestines, by appendicitis, by strangulation of the bowels, etc. According to the extent of the lesion the peritonitis may be localized or general. The membrane at the point of infection is at first hyperemic, is dull, and a serous or serofibrinous exudation soon appears. This rapidly becomes purulent, or may have been so from the beginning. If the process has not been a very rapid one the affected area will be covered by a thick whitish or creamy layer of fibrin. As the exudate increases in quantity it collects in localized pockets among the coils of intestine. The fibrin may undergo organization, adhesions form, and the purulent matter be surrounded and walled off. It may be absorbed, infiltrated with lime salts, or replaced by fibrous tissue. The pus may burrow and empty either externally or into some hollow organ. If the adhesions have not been sufficiently dense the abscess may break through and infect the greater part of the peritoneum. In such a severe form the serous membrane becomes infiltrated and partially disorganized. Localized peritonitis is not usually fatal, but in the general form recovery is rare. When peritonitis subsides, and the individual lives, adhesions of varying

extent remain. These eventually become transformed into dense fibrous bands that may cause very severe trouble by binding the coils of intestine together, or by so compressing them that the bowel becomes more or less obstructed. As a result of the acute inflammation the peristaltic action of the intestines is at first stopped by spasmodic contractions. In a very short time the muscle fibers become paralyzed, and there is then almost complete cessation of motion. General septicemia may follow the peritonitis."—(McConnell's *Pathology.*)

10. *Tumors are classified as follows:*

I. Those derived from mesoblast:
   (*a*) *Benign:* Lipoma, fibroma, chondroma, osteoma, myxoma, myoma, neuroma, glioma, angioma, lymphangioma.
   (*b*) *Malignant:* Sarcoma.

II. Those derived from epiblast or hypoblast:
   (*a*) *Benign:* Adenoma, papilloma.
   (*b*) *Malignant:* Carcinoma.

III. Cystic tumors.

IV. Teratomata.

Epithelioma, or squamous-celled carcinoma, may arise on any surface covered with stratified epithelium. It usually arises in the middle-aged or elderly, but may also occur in the young. It often results from long-continued irritation, and may arise in old scars or ulcers. It may appear in one of three forms: (1) A wartlike growth with an indurated base; (2) a small circular ulcer with raised, rampartlike edges; (3) an indurated fissure. The growth extends to the deeper structures; the surface ulcerates and becomes foul from contamination with putrefactive organisms. The nearest lymphatic glands always become infected sooner or later, and a fatal termination occurs rapidly unless treatment is early and thorough. Secondary deposits, except in the glands, are rarer than in glandular carcinoma. The glands sometimes undergo cystic change invade the skin, ulcerate, become foul, and may cause death by secondary hemorrhage from ulceration into large blood-vessels.

PHYSICAL DIAGNOSIS.

1. The radial pulse is selected on account of its accessibility. The points to be noted are: The rate, rhythm, tension, regularity, duration and strength of the pulse; also the size of the artery, any abnormal thickening of the artery, and the synchronism of the pulse on the right and left sides.

2. The average pulse rate in the adult male is about 75 to 80 beats per minute; in the female it is about five to eight beats faster per minute.

3. The periods are those of good compensation impaired compensation, and lost compensation.

4. *Complete Incompensation.* "This term should be applied to those cases in which the heart muscle has completely lost its recuperative quality, as seen in the terminal stages of all chronic heart affections that terminate gradually, or by sudden though not immediately fatal rupture of compensation. The best examples are seen in terminal cases of coronary sclerosis, fatty heart, and chronic myocarditis in general. So also in mitral lesions there comes a time when the heart that has alone, or with assistance, again and again recovered itself, finally yields, and resists all therapeutic measures. In such terminal and irrecoverable cases the orthopneic patient often rolls the head aimlessly from side to side, and wears a peculiarly listless, yet distressed and hopeless, expression. The term is frequently erroneously applied to cases of very marked and extreme cardiac weakness, and especially to that of mitral regurgitation or stenosis, associated with secondary tricuspid leakage and general anasarca. In mitral regurgitation especially, the assumption of terminal incompensation is seldom justified as a primary assumption, for there is no cardiac lesion in which proper treatment can do so much, however extreme may be the manifestations. Indeed, in the case of all heart lesions it is only after trying and failing that surrender is justifiable on the part of the physician." —(Greene's *Medical Diagnosis.*)

5. CARDIAC DILATATION: "*Inspection* detects enlargement and distention of the superficial veins and an indistinct, often wavy and diffused, cardiac impulse. If tricuspid regurgitation is present, jugular pulsation will be observed. *Palpation* confirms inspection; the impulse is feeble, irregular, and heaving. *Percussion* serves to determine extension of the area of cardiac dullness transversely, and especially toward the right side. *Auscultation* in the presence of valvular lesions reveals characteristic murmurs. If there are no valvular lesions the cardiac sounds are weaker than normal and the first sound is sharper in quality than usual."—(Hughes' *Practice of Medicine.*)

6. In acute bronchitis, the following râles may be heard: Sibilant, sonorous, mucous, bubbling and gurgling.

7. *Pulmonary phthisis.* The early subjective symptoms of the ulcerative form are progressive weakness and emaciation, nocturnal sweats, cough, hemoptysis, morning nausea, chest pains with localized constriction, dyspnea, and laryngitis. The objective symptoms include diminished expansion over the affected area, slightly increased fremitus, impaired resonance on percussion, inspiration harsh and high pitched, with prolonged expiration, exaggerated vocal resonance, the presence of mucous râles at the apex and sometimes posteriorly at the base of the lungs, evening rise of temperature, rapid and feeble pulse, and the appearance of tubercle bacilli in the sputum. In the later stages the symptoms are all greatly exaggerated: Bacilli are more abundant, the weakness and emaciation become more profound, night sweats excessive, higher temperature and hectic symptoms, diarrhea, mucus often greenish, containing small, nummular lumps, cheesy in character and containing many bacilli.—(From *Cyclopedia of Medicine and Surgery.*)

8. *Congenital or chronic hydrocephalus.* "The first manifestation of the disease to attract attention is the increased size of the head in an emaciated child whose appetite is good and who seemingly partakes of food well. The head appears too heavy; the eyes are prominent, and have a downward direction; the face is devoid of expression, old and wrinkled, the voice feeble, and the mental development is not in keeping with the age. When the period for standing or walking arrives the power is found wanting. The further history is but a continuation and exaggeration of this state, until convulsions occur, which sooner or later terminate fatally. The course of congenital hydrocephalus is usually slow, but becomes progressively worse. The majority terminate within the first year. cases are recorded, however, of ten and fifteen years' duration."—(Hughes' *Practice of Medicine.*)

9. *Retinal hemorrhage* may indicate: Degenerated arteries, chronic nephritis, cardiac hypertrophy, gout, scurvy, purpura, severe anemia, hemophilia, malaria, ulcerative endocarditis, pyemia.

10. *Syphilitic heart disease.* "A sense of oppression, palpitation, and extreme irregularity of the heart action, dyspnea, and precordial pain or anginal attacks, occurring in a patient who is known to be the subject of tertiary syphilis, may enable at least a probable diagnosis of cardiac syphilis. Sudden death occurs in 33 per cent. of these cases."—(Butler's *Diagnostics of Internal Medicine.*)

OKLAHOMA.

PRACTICE.

1. PHYSICAL SIGNS OF PLEURITIC EFFUSION. *Inspection* shows immobility of the chest walls, with some enlargement on the affected side; the intercostal spaces may bulge, and there is displacement of the heart beat. *Palpation* shows the vocal fremitus to be absent. *Percussion* shows flatness or dullness, with increased resistance to the pleximeter finger. *Auscultation* shows absence of respiratory sounds except at the upper part of the compressed lung, where bronchial respiration and bronchophony or egophony are heard. Over the healthy lung the respiratory sounds are exaggerated.

2. As compared with râles in the bronchial tubes, *pleuritic friction* is more superficial, coarser, and is heard with both inspiration and expiration.

3. PHYSICAL SIGNS OF MITRAL REGURGITATION. "*Inspection* shows displacement of the apex beat downward and to the left. In children and youths, bulging of the precordium and increased cardiac impulse are present. In emaciated individuals, an auricular impulse may be observed to the left of the pulmonic area in the second interspace. *Palpation* serves to confirm inspection. The displaced cardiac impulse is forcible and diffused in the early stage; as compensation fails, the impulse becomes feeble or absent. *Percussion* shows an increase in the area of cardiac dullness transversely and vertically. *Auscultation* reveals a systolic or blowing murmur, heard best in the mitral area and transmitted to the apex, left axilla, and under the angle of the scapula. It may occur with or take the place of the first sound of the heart, the second sound being markedly accentuated, particularly in the pulmonic area."—(Hughes' *Practice of Medicine.*)

4. *Five diseases caused by a known germ:* Typhoid, diphtheria, syphilis, cholera, tuberculosis, and erysipelas.

5. *Yellow fever is endemic* in the southern part of the United States, Mexico, some of the islands in the Caribbean Sea, Central America, Venezuela, Guiana, Brazil, and the west coast of Africa.

6. *The diagnosis of typhoid* is based on the characteristic temperature chart, the rose rash, enlarged spleen, and a positive diazo-reaction and Widal test; the absence of leucocytosis and epistaxis, and an early dicrotic pulse have a diagnostic significance. The finding of the typhoid bacilli in the blood, urine, or feces is valuable.

7. *Rubeola:* Period of incubation ten to twelve days.

Stage of invasion, four days. Character of eruption, small, dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. As compared with scarlatina, the eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present.

8. *Treatment of whooping-cough:* Isolation of the patient, disinfection of all articles used by him, fresh air, sunlight, light but nutritious diet, a saline cathartic, belladonna or antipyrin or bromoform or chloral, antiseptic and sedative sprays for the throat; vaccine treatment has been recommended by some; during convalescence, tonics, especially iron, quinine, strychnine, and cod liver oil, are of service.

9. *In acute articular rheumatism,* the joint is affected rather than the shaft of the bone; the disease is apt to affect more than one joint; the constitutional symptoms are less marked; movement of the joint produces pain; administration of salicylates often relieves the pain and other symptoms; tonsilitis and cardiac murmurs are common accompaniments.

In *periostitis* the shaft of the bone is chiefly affected; as a rule, only one bone is involved; the constitutional symptoms are more severe; the joint may be moved without pain, but pressure on the shaft of the bone causes very severe pain; salicylates have no effect on the disease; tonsilitis and cardiac murmurs have no connection with periostitis.

10. *The Wassermann reaction.* "A guinea-pig or rabbit is inoculated several times intravenously with the washed blood corpuscles of a rabbit or sheep, with the consequent production of a hemolytic serum specific for the corpuscles of a rabbit or sheep respectively, and the serum is inactivated. An antigen is prepared by mincing and triturating the liver of a syphilitic fetus in physiological salt solution. The serum from the patient is inactivated in the same way as the hemolytic serum—by heating to 56 deg. C. for thirty minutes, thus destroying the alexin. A complement is made by diluting guinea-pig serum tenfold. The test fluid is added to the antigen extract, some complement is added, and the mixture left for four hours at 20 deg. C. The hemolytic system (a mixture of inactivated hemolytic serum and the washed blood corpuscles for which it is specific) is added, and if after four hours no hemolysis has taken place syphilitic taint is present. The

antibody in the patient's blood has attacked the treponemes which abound in the liver of the infected fetus, the complement is absorbed, and there is none left to cause the inactivated hemolytic serum to dissolve the blood corpuscles. Conversely, if no syphilitic antibody exists in the patient's blood, the complement is left free, and is deviated to the sensitizer of the hemolytic serum, and allows this to cause hemolysis of the blood corpuscles. Controls with normal and with syphilitic sera, with and without antigen, are put through at the same time."—(*Aids to Bacteriology.*)

HYGIENE.

1. *Six desirable factors in the location of a resort for consumptives:* "The ideal place for a patient with pulmonary tuberculosis should possess purity of air, a dry, porous, salubrious soil, good potable water in sufficient quantities, good sewage disposal, relative protection from wind, and such a temperature that the patient can spend hours out of doors without discomfort. Abundant sunshine, infrequency of fogs, the persistence of snow throughout the winter, are all of value."—(Osler's *Modern Medicine.*)

2. *Hygiene* is the art and science of all that pertains to the preservation, promotion and improvement of health and the prevention of disease.

3. *Persons who are prone to catch cold* should wear suitable clothing, especially during changeable weather; should avoid overheated and unventilated rooms; should also avoid draughts and exposure to wet and damp; should take frequent baths and adequate exercise; and should keep themselves in the best possible health.

4. A disease is said to be *endemic* when it is found in a certain locality more or less constantly; it is said to be *epidemic* when it affects a large part or the whole of a certain community.

5. *Hookworm disease* enters the human body by the mouth; the ova are transferred to the mouth on unclean hands or by contaminated drinking water.

To prevent its spread: Children and adults should be made to wear shoes; proper toilet facilities should be provided, and their use enforced; bathing or wading in shallow water should be forbidden; a proper water supply should be available for drinking purposes; and prompt recognition and treatment of all cases should be encouraged.

6. *Diphtheria* is conveyed through the air or by the mouth; it is transmitted by contact with those already

infected, by fomites, by cats or pigeons, etc., by careless disposal of the nasal and oral secretions, by careless coughing or sneezing, whereby the bacilli are carried through the air to the nose or mouth of others.

7. *Vaccination.* "The arm (near the insertion of the deltoid muscle) or the calf of the leg is usually selected for vaccination. The skin having been cleansed with water and soap (no antiseptics, since they destroy the vaccine), an area one-eighth to one-quarter inch in diameter should be scarified with a sterile scalpel or needle so as to remove only the epidermis, whereupon the vaccine should be rubbed in. One should be careful not to draw blood. A single area for inoculation is sufficient. After the vaccine has dried it should be covered with an antiseptic dressing and the wound thereafter treated aseptically. Most of the cases of serious inflammation of the arm following vaccination are attributable to secondary infection of the wound." *Possible complications* are: Erythema, urticaria, vesicular and bullous eruptions, erysipelas, impetigo, ulceration, glandular abscess, septic infections, gangrene, syphilis; septic infection is the most common complication; tetanus has also been transmitted.—(From Kelly's *Practice of Medicine.*)

8. *Malaria* is *transmitted* by the bite of the anopheles mosquito. *Prophylaxis of malaria:* Individuals should use mosquito netting around their beds and wire gauze in doors and windows so as to keep out the mosquitoes as much as possible. During residence in malarial districts quinine should be taken every morning, before breakfast. All pools, stagnant water, etc., where *anopheles* may breed, should be removed. All mosquitoes, larvæ, etc., should be destroyed as far as possible. By staying indoors during dusk and darkness, opportunities for infection may be avoided. Occasional fumigation with formaydehyde or sulphur is also beneficial.

9. *Habits of school children which tend to produce myopia* are: Reading fine or indistinct print, reading in poor illumination, improper positions in reading or writing, using the eyes when tired, excessive study combined with insufficient exercise, and the use of glazed and shiny blackboards.

10. The room should be 40 feet long, 30 feet wide, and 15 feet high; this will allow 360 cubic feet of space for each child.

OBSTETRICS AND GYNECOLOGY.

1. *Fetal circulation:* "The blood returning from the

placenta, after having received oxygen and being freed from carbonic acid, is carried by the umbilical vein to the under surface of the liver; here a portion of it passes through the ductus venosus into the ascending vena cava, while the remainder flows through the liver and passes into the vena cava by the hepatic veins. When the blood is emptied into the right auricle it is directed by the Eustachian valve through the foramen ovale, into the left auricle, thence into the left ventricle, and so into the aorta and to all parts of the system. The venous blood returning from the head and upper extremities is emptied by the superior vena cava into the right auricle, from which it passes into the right ventricle, and thence into the pulmonary artery. Owing to the condition of the lung, only a small portion flows through the pulmonary capillaries, the greater part passing through the ductus arteriosus, which opens into the aorta at a point below the origin of the carotid and subclavian arteries. The mixed blood now passes down the aorta to supply the lower extremities, but a portion of it is directed by the hypogastric arteries to the placenta, to be again oxygenated."—(Brubaker.)

2. The three embryonic layers are the epiblast, the mesoblast, and the hypoblast. The *skin* is derived from the epiblast; the *bones* from the mesoblast.

3. The *bacteria which cause puerperal infection* are: Steptococcus pyogenes, staphylococcus pyogenes aureus, gonococcus, bacillus coli communis, bacillus diphtheriæ, bacillus typhosus. They are generally introduced by the fingers of the physician or nurse, or by instruments, or general lack of cleanliness. *Treatment:* Prophylaxis is of the greatest importance. Purgatives; vaginal douches; some recommend curettage, others decry it; the introduction of antiseptics into the uterus; supportive and general treatment are indicated; specific sera and vaccines have been recommended by some.

"*The treatment of puerperal sepsis* is both local and general. Locally a thorough disinfection of the whole genital canal is called for in every case. It may appear unnecessary, and may prove, on actual experience, to be even harmful, but no one can tell beforehand how necessary this procedure is. In the vast majority of cases it is productive of the greatest good. It is only occasionally useless, and very rarely actually harmful. It should precede all other treatment for puerperal infection. The method of disinfecting the genital canal may be described as follows: A double tenaculum, a large, dull curette, a placental forceps, and an intra-

uterine catheter are boiled for fifteen minutes. The operator disinfects his hands and arms and wears sterile gloves. The patient is placed in the dorsal posture across the bed, with her buttocks resting on a rubber pad. The external genitalia and the vagina are scrubbed with tincture of green soap and pledgets of cotton; the vagina is douched with a sublimate solution 1:2000. The operator then seizes the anterior lip of the cervix with a tenaculum. An intrauterine douche of sterile water, at least a quart, is administered. Then, with the placental forceps, and, if necessary, with a dull curette, the uterine walls are gone over thoroughly but lightly in all directions, six to twelve times, until nothing is brought away but bright blood. A second intrauterine douche concludes the treatment. If the womb is flabby and large, with a tendency to flexion, so that the drainage of the uterine cavity is not good, it is advisable to pack it with iodoform or sterile gauze. In addition to cleansing the uterine cavity, false membranes or areas of inflammation and localized infection on the cervix or vagina should be treated by the application of a solution of nitrate of silver, a dram to the ounce. It may be necessary to repeat the intrauterine douches several times—in fact, several times a day for many days; in this case plain sterile water only should be used. The general treatment is stimulating. The patient should have as much food of an easily digestible character, chiefly milk, as she can assimilate, and as much alcohol as she can consume without showing the physiological effects of it. Digitalis is useful as long as the pulse is above 110. Strychnine may be combined with it in suitable cases. To tide the patient over emergencies carbonate of ammonium in large doses, by the bowel, and nitroglycerin hypodermatically, may be required. Inhalations of oxygen may be of service. Absolute rest and freedom from all disturbances, mental and physical, must be insisted upon, and the patient should be given the best nursing that the family can afford." (Hirst's *Obstetrics.*)

PUERPERAL ECLAMPSIA. *Etiology:* Uremia, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease and imperfect elimination by the skin, bowels, and kidneys. "*The treatment of the attack* consists of the administration of chloroform by inhalation, chloral hydrate (gr. 60) by enema, and the fluidextract of veratrum viride hypodermically (gtt. 15 followed by gtt. 5, repeated frequently enough to keep

the pulse at about 60 beats a minute), to control the convulsions, and free purgation by croton oil (gtt. 2, or 3, in sweet oil or glycerin), free sweating by the hot pack, and sometimes depletion by venesection to eliminate the poison. The after treatment consists of free purgation by the salines, restriction of diet, and later the administration of tonics and stimulants. The obstetric treatment is usually non-interference." (*Pocket Cyclopedia.*) Sometimes *accouchment forcé* is indicated.

4. The contents of the obstetrical bag will vary with the requirements and experience of its owner, and the preparations already made by the patient. In any case the following articles should be taken by the accoucheur to a confinement: Tablets of bichloride of mercury, or some other material for making antiseptic solution; forceps; ether or chloroform, with inhaler or mask; fluid extract of ergot; hypodermic syringe, with tablets of strychnine, morphine, etc.; needles, sutures, and needle holder; nail brush and nail cleaner; umbilical scissors; carbolized vaseline; stethoscope; male catheter (rubber); a 1 per cent. solution of nitrate of silver, with eye dropper.

In addition to the above some would also include: A sterile apron or suit; a Kelly pad; solution of cocaine; soap, boric acid, and gauze, all sterilized; absorbent cotton, iodoform gauze, chloral hydrate; dilators and other instruments.

A bag or grip made of canvas, or a metal case covered with canvas, is better than a leather bag, as the former can be sterilized.

Pituitrin is an extract from the posterior lobe of the pituitary gland; it may be given cautiously in cases of uterine inertia; the dose is 1 cc. by intramuscular injection. As it may cause very severe uterine contractions, it should not be given unless the os is dilated and there is no obstruction to delivery.

5. The *absolute indications for cesarean section* are: Extreme pelvic contraction or deformity in which delivery by forceps or version or symphyseotomy is impossible, and in which craniotomy is either impossible or would be more dangerous to the mother; the presence of extreme atresia of the vagina; rupture of the uterus; sudden maternal death.

"Owing to the present low mortality of cesarean section, the indications for its performance have been considerably extended in recent years. It is now performed under most of the conditions which were pre-

viously held to necessitate craniotomy upon the living child, and it will probably in time almost replace symphyseotomy; while, owing to the uncertainty of the survival of the child after induction of premature labor it is encroaching upon the field of this operation also. As regards maternal risk, it compares unfavorably with induction of premature labor, in which there is practically none; but the chances of the survival of the child in the second degree of pelvic contraction are very much greater by cesarean section than by induction. It must, however, be understood that this operation is only justifiable for moderate degrees of pelvic contraction, when it can be performed with adequate preparation and under favorable surgical conditions. In the case of patients seen for the first time when in labor the alternatives of craniotomy and symphyseotomy will sometimes have to be considered even when the child is living. There is no doubt that it is better to perform craniotomy than to attempt to deliver a child by cesarean section hurriedly undertaken, with insufficient antiseptic preparation, in insanitary surroundings, or by an operator unaccustomed to the technique of aseptic surgery. And further, it may be wiser to perform craniotomy than cesarean section when repeated unsuccessful attempts have been previously made to deliver through the natural passages; for apart altogether from the possible risk of infection having occurred, the chances of the survival of the child, even if delivered alive by cesarean section, have been necessarily prejudiced by repeated and prolonged attempts to extract it with forceps through a narrow pelvis. Cranial injuries may thus be caused from which the child will almost inevitably die, even if born alive. If there are any positive signs of infection having occurred, such as offensive smell of the liquor amnii, or fever associated with signs of illness or exhaustion on the part of the mother, the child's life should be unhesitatingly sacrificed, cesarean section in such a case being an extremely dangerous operation."—(Eden's *Practical Obstetrics.*)

6. In the nulliparous adult the *uterus* is about three inches long, about two inches wide at the upper part, and about one inch thick. It is pear-shaped, and lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and

the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine, rectouterine, ovarian and uterosacral. The arteries are the uterine and ovarian; the nerves are from the uterovaginal plexus, the hypogastric plexus, and the vesical plexus.

The *Fallopian tubes* are about 4½ inches long, and extend from the cornua of the uterus outward to the free surface of the ovary. The lumen of the tube is much greater at the ovarian end than at the uterine end. At the outer end it is surrounded by fringed processes called the fimbriæ. It lies at the upper edge between the two layers of the broad ligament.

The *ovaries* are almond shaped, about 1½ x ¾ x ½ inch; they are attached to the posterior layer of the broad ligament, at the outer end of and a little below the Fallopian tube.

7. *Curettage is indicated:* (1) For removal of placental débris, (2) in hemorrhagic endometritis, (3) in some forms of dysmenorrhea (membranous), (4) for diagnostic purposes, (5) in some cases of puerperal sepsis, (6) sometimes to check hemorrhage due to fibroids. *Contraindications:* (1) The least suspicion of even the possibility of pregnancy, (2) menstruation, (3) acute endometritis, (4) malignant disease of the uterus or vagina, (5) acute pelvic inflammation.

8 and 9. *Amenorrhea* is absence of menstruation. It is *physiological:* Before puberty, during pregnancy and early lactation, and after the menopause. It may also be due to: Absence or imperfect development of the generative organs; also to stenosis, obstructions, or atresia of the genital tract; also to operative removal of the uterus or its appendages. Other causative factors are: Acute infectious diseases, anemia, chlorosis, obesity, drug habits, alcoholism, overstudy, lack of exercise, exposure to cold, and various emotional causes. The *prognosis* depends upon the cause. *Treatment* consists in: (1) Removing the cause, if possible; (2) general treatment by means of proper hygiene, rest, diet, bathing, attention to the bowels, exercise, etc.; (3) drugs reputed to be emmenagogues, such as iron, manganese, aloes, strychnine, apiol, oxalic acid, savine, rue, and tansy.

Dysmenorrhea is painful menstruation. *Causes:* Pelvic congestion, pelvic inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis, or obstruction of the cervix, prolapse or displacement of the

uterus. The *prognosis* depends upon the cause. *Treatment:* If possible, remove cause; attend to the general condition, hygiene, tonics, regular habits, etc.; curettage may be necessary, and may have to be repeated (perhaps more than once).

RETROFLEXION.—*Etiology:* Tight lacing and tight clothing; congenital conditions; pressure by tumors; metrititis and parametritis with adhesions; atonic conditions of the uterus following labor, and the conditions that cause retroversion. *Prognosis* depends upon the cause. *Treatment:* If there are no adhesions, the flexion should be corrected by digital manipulation and a pessary introduced; hysteropexy may be necessary.

RETROVERSION.—*Etiology:* Relaxation of uterine ligaments; increased weight of fundus; subinvolution; ovarian or other tumor pressing on front of uterus; distended bladder; peritonitis or cystitis; prolonged dorsal decubitus and tight bandaging in the puerperium. *Prognosis* depends upon the cause. *Treatment:* Remove the cause, if possible; replace the uterus and keep it in position by pessaries, tampons, and knee-chest position; pelvic massage and vaginal douches; proper hygiene, particular attention being paid to the bowels, clothing, and exercise. *Curative treatment:* The choice lies between ventral suspension of the uterus and shortening of the round ligaments.

CYSTOCELE is a hernia of part of the bladder into the vagina, covered by the mucous membrane of the anterior vaginal wall. RECTOCELE is a hernia of the rectum into the vagina, covered by the mucous membrane of the posterior vaginal wall. The two conditions are generally found together. *Causes:* Laceration of the perineum, prolapse of the uterus, relaxation of the structures forming the pelvic floor, and subinvolution of the vagina after labor.

Treatment consists of a plastic operation—repair of the perineum and colporrhaphy.

PYOSALPINGITIS is a purulent inflammation of the Fallopian tube. *Etiology:* Septic infection or gonorrhea. The *treatment* of the acute form consists in rest in bed, free purgation with Rochelle salts (3i every hour), hot vaginal douches, and hot applications to the abdomen. If the symptoms become more severe celiotomy is indicated. The chronic form may be treated during the menstrual period by rest in bed, free purgation, hot vaginal douches, local applications of iodine to the cervix and vaginal vaults, and glycerin tampons. If these measures fail, removal of the tube and ovary

and replacing the retroverted uterus, etc., are necessary.

ENDOMETRITIS is inflammation of the mucous membrane lining the uterus. The acute form is due to the introduction of septic bacteria, and is manifested by pain, constipation, irritability of bladder, rapid pulse, rise of temperature, and a profuse discharge. *Treatment* following miscarriage or labor consists in curettage, intrauterine hot sterile douche, free purgation, hot stupes over the lower abdomen, milk diet and stimulants. Chronic endometritis may accompany numerous pathological uterine conditions, but is generally due to gonorrhea. The symptoms are backache, headache, leucorrhea, profuse menstruation, and impairment of the general health. *Treatment* consists in removing the cause when possible, and when due to gonorrhea curettage and irrigation of the uterus, with the application of an antiseptic.

10. GONORRHEA.—*Etiology:* The gonococcus of Neisser. *Symptoms.*—Pain and burning in the vulva; pain and burning on micturition; dyspareunia; yellowish or greenish discharge, in which the gonococcus can be found; the vagina is hot, red, swollen, and tender. *Possible results.*—Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomala of vulva, abscess of Bartholin's glands. *Diagnosis* is made from the symptoms, particularly from finding the gonococcus in the discharge. It is *so serious* on account of the possible results enumerated above; it often leads to chronic invalidism, and may be the cause of death.

Treatment: Rest, if possible in bed; freedom from alcoholic or sexual excitement; a mild and unirritating diet; salines and diuretics; plenty of water to drink; a warm sitz bath; douching of vagina with about a gallon of a 1:5000 bichloride solution, or of borax (1 dram to the quart), or of potassium permanganate (1 per cent. solution); the douche is to be taken in the recumbent position.

SURGERY.

1. The *tonsils* occupy the recesses between the pillars of the fauces, the anterior pillar being formed by the palato-glossus and the posterior by the palato-pharyngeus. On the outer side of each is the superior constrictor, and internally the buccal mucous membrane. Their arterial supply is large, from the ascending pharyngeal, ascending and descending palatine, tonsillitic and dorsalis linguæ arteries.—(From *Aids to Anatomy*).

Acute Tonsillitis probably arises from infection with micro-organisms, but cold is a predisposing cause. The inflammation may be superficial, and only portion of a general catarrhal inflammation of the velum and pharynx. Treatment is by a gargle of chlorate of potash.

Acute Follicular Tonsillitis is marked by general enlargement of the tonsils, with consequent obstruction to breathing and swallowing. Patches of exudation are seen at the mouths of the follicles, the temperature is raised, the bowels are confined, and the submaxillary glands are enlarged and tender.

Acute Parenchymatous Tonsillitis is inflammation of the tonsil, soft palate, and fauces, and often results in a peritonsillar abscess. The palate and anterior pillar are dusky and swollen, and the tonsil is pushed across to the mid-line. These conditions are distinguished from scarlet fever by the absence of the characteristic rash. Follicular tonsillitis is treated by giving calomel (5 grains), salicylate of soda, and an antiseptic throat spray. Peritonsillar abscesses must be opened by puncturing the most prominent part of the swelling and enlarging the opening with forceps.

Chronic Tonsillitis results in hypertrophy, and is usually associated with adenoids. The tonsils are large and pale, and show the large orifices of the crypts. Recurrent attacks of inflammation are common. The patients are usually mouth-breathers and snore at night. Deafness may occur from associated swelling of the orifice of the Eustachian tube. *Treatment.*—Fresh air and good food, together with painting the tonsils daily with glycerine of tannic acid, will cure some cases; but most resist this treatment, and so tonsillotomy is required. This may be done with cocaine or gas, and the tonsil is best removed with the spade guillotine. Forceps and a tonsil bistoury may also be used. Hemorrhage soon ceases in children. If it continues, iced lotion should be applied; if that fails, the galvanocautery. The tonsil may also be shelled out with the finger after snipping the mucous membrane in front of it.—(*Aids to Surgery*).

2. *Pterygium* is a triangular fold of membrane extending from the inner or outer part of the ocular conjunctiva to the cornea; the apex is immovably united to the cornea, the base spreads out and merges with the conjunctiva. It is thought by some to originate from pinguecula, the process extending to the cornea and drawing the conjunctiva after it. It occurs in elderly persons who are exposed to wind or dust.

Treatment: The pterygium may be dissected away with a sharp scalpel or Beer's knife, and cut off, the conjunctival defect being closed by uniting the upper and lower borders, undermining the conjunctiva if necessary to bring the edges together. The apex of the pterygium must be thoroughly excised from the cornea, and its attachment in this situation scraped or cauterized with the actual cautery, to prevent recurrence. Instead of cutting off the pterygium, it may be dissected up and stitched underneath the detached conjunctiva, either above or below; or it may be divided into two halves, of which one is transplanted above and the other below, being held in the conjunctival pocket by a stitch.—(May's *Diseases of the Eye.*)

3. *Three dressings suitable for fractured clavicle.* (1) *Velpeau's bandage:* "First place the arm in the Velpeau position, the hand of the injured side on the opposite shoulder. From the axilla of the sound side pass across the back, over the outer part of the injured shoulder, down across the middle of the arm, behind the elbow, across the chest, and through the axilla of the sound side to the point of starting. Next apply a horizontal turn on a level with the affected elbow. Repeat these turns until the elbow is covered with the vertical, and the wrist with the horizontal turns. The vertical turns should overlap two-thirds of each preceding turn, and the horizontal ones one-third. Secure the bandage by strips of adhesive plaster. (2) *Desault's bandage:* "Three bandages and a wedge-shaped pad are required. The pad is placed in the axilla of the injured side, base up. The arm is allowed to hang by the side, and the forearm is flexed at a right angle. The first bandage is used to hold the pad in place. Beginning at the base of the pad, descending spiral turns, encircling the chest, are applied down to its apex near the elbow, and then ascending spiral turns back to its base. To hold the pad up in the axilla, the first bandage may be terminated with a figure-of-8 turn of the opposite shoulder. The second bandage binds the arm to the side. Beginning at the axilla of the sound side, on a level with the base of the pad, descending spiral turns are applied, with increasing firmness, down to the elbow, so as to carry the shoulder outwards. The third bandage is applied in the form of an anterior and a posterior triangle, the apex of each being formed by the axilla of the sound side, and the base by the humerus of the injured side. Begin the bandage at the axilla of the sound side posteriorly, pass over the affected shoulder, down in front of and parallel with the

humerus, under the elbow, and across the back to the starting point. The anterior triangle is applied in the same way, by continuing the bandage through the axilla, across the chest, over the shoulder of the injured side, down behind the humerus, under the elbow, and back across the front of the chest to the starting point. (3) *Sayre's dressing:* "Two strips of adhesive plaster three or four inches wide, and long enough to extend around the chest one and a half times are prepared. Lint powdered with zinc stearate is placed in the fold of the elbow and between the arm and the chest. A collar of lint as wide as the adhesive strip is placed about the arm just below the axilla, and over this is applied the end of one of the strips of plaster, so as to form a loop; the strip is now used to pull the arm backwards, and is fastened around the chest. The hand of the affected side is placed on the opposite shoulder, and the second strip of plaster, with a hole for the point of the elbow, is run from the back of the sound shoulder, under the elbow of the affected side, over the sound shoulder, to the back, thus drawing the elbow forwards and upwards, and with the aid of the first strip, which acts as a fulcrum, forcing the shoulder backwards and outwards. A pad, held in place by a strip of adhesive plaster, may be placed just above the clavicle to press the fragment downwards."—(*Stewart's Surgery.*)

4. *In fracture of the middle of the humerus,* the *musculospiral nerve* may be injured. If this injury is sufficient to produce paralysis, the patient is unable to extend the wrist and fingers, or to supinate the forearm. Sensation, in the lower half of the outer and anterior aspect of the arm and in the middle of the back of the forearm, is lost or impaired.

5. The *treatment of carbuncle* is excision in those cases in which the carbuncle is favorable situated; the wound is allowed to granulate under antiseptic dressings. In other cases the honeycombed mass should be opened freely by crucial incisions, and as much of the necrotic tissue as possible removed by forceps and scissors. The wound should then be disinfected with peroxide of hydrogen and bichloride of mercury solution, 1 to 1,000, and dressed with warm antiseptic fomentations. The constitutional treatment is that of sepsis.

The *treatment of furuncle* is incision, when the boil is mature. Tonics, calx sulphurata, dilute sulphuric acid, brewer's yeast, and vaccines have been recommended in the treatment of this trouble.

6.

CHANCRE.	CHANCROID.
First lesion of a constitutional disease, viz., syphilis.	A local disease.
Due to syphilitic infection.	Due to contact with secretion from chancroid.
Generally a venereal infection.	Always a venereal infection.
May occur anywhere on the body.	Nearly always on genitals.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three).
Generally single.	Generally multiple.
Not autoinoculable.	Autoinoculable.
Secretion slight.	Secretion profuse and purulent.
Slightly or not at all painful.	Generally painful.
As a rule only occurs once in any patient.	May reoccur in same patient.
Buboes are painless and seldom suppurate.	Buboes are painful and usually suppurate.

Chancroid of the penis may be treated by being sprayed with peroxide of hydrogen, dried with cotton, then touched with pure carbolic acid and then with pure nitric acid; afterwards a dressing soaked with black wash may be applied. The penis should be soaked in hot salt water (a teaspoonful of salt to a pint of hot water) every few hours; and the peroxide of hydrogen spray, the drying with cotton, and the application of the dressing should be repeated.

7. *In the non-operative treatment of acute appendicitis: Ochsner* recommends that hot moist compresses be applied to the abdomen; he advises hot boric acid solution and alcohol.

Murphy recommended enteroclysis by the drop method, to relieve the thirst.

Fowler recommended that the patient be put in the semi-sitting posture.

8. *"The treatment of a severe contused-lacerated wound,* in the absence of urgent hemorrhage, is directed to the shock. After this has subsided, the patient should be anesthetized in order thoroughly to disinfect the wound. Tissue whose vitality is questioned should be

removed if it is unimportant, in other cases it should be retained unless known to be badly infected. All visible vessels, whether bleeding or not, are ligated, and provision made for abundant drainage. It is important to introduce as few sutures as possible, and to be sure that they do not unduly constrict the tissues, otherwise the subsequent swelling will cause necrosis. The wound is dressed with hot antiseptic fomentations. The later treatment depends upon the complications. If there are symptoms of sepsis, the whole wound should be opened, redisinfected, and packed with antiseptic gauze. Sloughing demands hot antiseptic fomentations, and removal of the slough at the earliest possible moment. Secondary hemorrhage may occur at this period from the separation of a slough involving the wall of an artery. The general health should, of course, receive proper attention."—(Stewart's *Surgery.*)

9. *Radiography* has been employed as an aid to *diagnosis* in the case of: Foreign bodies, fractures, dislocation, epiphyseal separation, injuries around a joint, diseases and tumors of bones, pathological conditions of the mastoid and accessory sinuses of the skull, tuberculous deposit or cavity formation in the lungs, thickened pleura, aneurysms, enlarged glands, tumors, various diseases of the esophagus, stomach and intestines, renal calculi, movable kidney, tuberculosis of the kidney, pus kidney, ureteral calculi, vesical calculi, and other conditions. Radiography is an aid in the *treatment* of disease, as follows: (1) It causes atrophy of the appendages of the skin; (2) it destroys organisms in living tissues; (3) it stimulates the metabolism of tissues; (4) it destroys certain pathological tissues; (5) it has an anodyne effect. It has been used in various skin diseases, malignant growths, ulcers, exophthalmic goitre and numerous other conditions.

10. *Gunshot wound of the chest.*—"The treatment, in the absence of serious hemorrhage or the lodgment of a foreign body, is disinfection and suture of the external wound and immobilization of the affected side of the chest. Hemorrhage from the internal mammary or intercostal artery may be controlled by ligation, or by pushing a gauze sac between the ribs and filling the inner end of the sac with gauze so that when drawn upon it will make pressure from within outwards. Excepting extensive wounds, bleeding from the lung is rarely fatal, as the bleeding is checked by collapse of the lung. In the absence of external hemorrhage, seri-

ous loss of blood is diagnosticated by the constitutional signs of acute anemia, and a rapidly accumulating hemothorax. Cases of this sort have been treated by the introduction of a drainage tube in order to admit air and favor collapse of the lung, but in the presence of serious symptoms one or more ribs should be resected, and the wounded lung dealt with directly by sutures or gauze packing. Foreign bodies should be removed if easily accessible, and the same rules as to the examination of the clothing, etc., apply here as elsewhere. If the foreign body is not easily found, it should be allowed to remain, unless it gives rise to subsequent trouble, when it may be definitely localized by the *x*-ray and its removal effected, if such be deemed advisable."

Perforating gunshot wound of the abdomen. "The treatment, even without symptoms of visceral injury, is immediate enlargement of the wound, in order to explore the abdomen, check hemorrhage, and close such visceral perforations as may be found. The abdomen is then flushed with salt solution, and closed or drained, according to the amount of soiling present. If the omentum protrudes it should be ligated and removed, while coils of intestine should be carefully washed with salt solution and returned to the cavity. In cases in which there is doubt as to whether or not a wound enters the peritoneal cavity, such wound should be enlarged and the diagnosis positively made, being prepared at the same time to treat any visceral injuries that may be found. In gunshot wounds on the battle field an exception has been made to the rule of immediate exploration, because it has been found that the chances of recovery are somewhat better without than with operation undertaken in the absence of proper facilities."—(Stewart's *Surgery*.)

TOXICOLOGY AND MEDICAL JURISPRUDENCE.

1. The *symptoms of strychnine poisoning* are as follows: "Strychnine produces a sense of suffocation, thirst, tetanic spasms, usually opisthotonos, sometimes emprosthotonos, occasionally vomiting, contraction of the pupils during the spasms, and death, either by asphyxia during a paroxysm, or by exhaustion during a remission. The symptoms appear in from a few minutes to an hour after taking the poison, usually in less than twenty minutes; and death in from five minutes to six hours, usually within two hours."—(Witthaus' *Essentials of Chemistry*.)

In *tetanus*, the onset is gradual, is apt to begin with trismus, swallowing is difficult or impossible, the condition is persistent, consciousness is dulled or lost, and there is history of a wound or injury. In *strychnine poisoning* the onset is more sudden, the muscles of the jaw and neck are generally the last to be affected, there are marked remissions with muscular relaxation, consciousness is retained, and there is no history of a wound or injury.

2. *Two drugs that produce convulsions:* Strychnine and picrotoxin.

Antidote to strychnine: There is no chemical antidote; chloral or chloroform may control the convulsions.

Antidote to picrotoxin: There is no chemical antidote; chloral or chloroform may control the convulsions.

3. *The antidote to silver nitrate* is solution of sodium chloride; it acts by converting the silver nitrate into the insoluble silver chloride: $AgNO_3+NaCl=AgCl+NaNO_3$.

4. *Symptoms of cocaine poisoning:* "When a large dose has been taken the symptoms are not unlike those of atropine poisoning. There is dryness of the throat, tongue, and nose, difficulty of swallowing, faintness, and sometimes nausea and vomiting. The pulse is usually increased in fullness and frequency at first. The respiration also becomes more rapid, and there is much general nervous excitement, with general hyperesthesia. The eyes are bright and staring and the pupils dilated. The patient talks volubly and incoherently. Sometimes an erythematous eruption appears on the skin. The stage of depression soon comes on, when the breathing becomes shallow, the heart's action more rapid, and the face pale or cyanotic. The surface becomes anesthetic, and muscular twitchings and paralysis precede death, which is generally caused by paralysis of respiration."—(Riley's *Toxicology.*)

5. *The antidote for alkaloids* is tannic acid; it acts by forming a precipitate with the alkaloid which is practically insoluble.

6. *Medical jurisprudence* is the application of the knowledge of any of the branches of medicine to the problems and requirements of the law.

7. In *burns* produced *before death:* there is usually a blister, with a bright, red base, and containing a serous fluid, which is albuminous; occasionally, there will be no blister if there has been excessive shock; also, there will be a red line of demarcation between the injured and the uninjured parts, and this, being a vital process, is only developed during life.

In *burns* produced *after death* there is no true blister, no red base, and gas is present in place of serous fluid.

8. *Abortion is justifiable:* "(1) In pelvic deformity where there is sufficient space for a seven months' child to be delivered without injury. The object is twofold: (*a*) to save the child's life by obviating the necessity for craniotomy; (*b*) to spare the mother the dangers of craniotomy, cesarean section, symphyseotomy, or other operations that might be required if the pregnancy went to full term. (2) In cases where, in previous labors, the head of the child at full term has been prematurely ossified, or unusually large, so that labor has been difficult and dangerous, even though the pelvis were normal. The period of delivery need only be two or three weeks before 'term' in these cases. (3) In cases where the children of previous pregnancies have died *in utero* during the later weeks of gestation from disease (fatty, calcareous, or amyloid degeneration, etc.) of the placenta. (4) In conditions where the continuance of pregnancy seriously endangers the mother's life, such as: excessive vomiting; albuminuria; uremic convulsions, or paralysis; chorea; mania; organic disease of the heart, lungs, liver, blood-vessels, etc., threatening fatal disturbance of the respiration, circulation, and other vital functions; irreducible displacements of uterus; placenta prævia with hemorrhage; and in dangerous pressure upon neighboring organs from overdistention of uterus, due to dropsy of amnion, tumors, multiple pregnancy, etc."—(King's *Manual of Obstetrics.*)

9. In some states a physician is not allowed to disclose certain information without the consent of the patient concerned; such information is considered "privileged communication." In other states, such exemption is not allowed. The physician, however, must obey the ruling of the court.

10. In expert testimony the witness may give his *opinion* on facts or supposed facts as noted by himself or asserted by others. *Theoretically,* this can only be done by those perfectly familiar with the subject in question; but *practically* any (or almost any) physician with a license to practise is accepted as an expert witness.

STATE BOARD EXAMINATION QUESTIONS

PENNSYLVANIA BUREAU OF MEDICAL EDUCATION AND LICENSURE.

PHYSIOLOGY, PATHOLOGY AND BACTERIOLOGY.

1. Name two bacilli that are apt to attack the respiratory tract. Describe the characteristic lesion of each. Outline the laboratory tests used in identifying each.

2. Describe briefly gastric digestion. Diagnose by laboratory methods each of two lesions which seriously impair it.

3. Outline briefly ways in which hypertrophied lymphoid tissue in the pharynx may be detrimental to health, (*a*) physiologically, (*b*) pathologically.

4. Given a case of pyuria (pus in the urine) outline the investigations and tests which may locate the source of the trouble.

5. Temperature of the body: Tell briefly how the heat is produced, (*b*) how regulated, the (*c*) physiological and the (*d*) pathological significance of any increase or decrease from normal.

6. Describe the gross lesion in (*a*) tabes dorsalis, (*b*) apoplexy. What alteration in function does each produce?

7. Give a general outline of the essential equipment for a clinical laboratory. Outline the type of work which should be performed in such a laboratory.

8. Given a case of irregular fever in an adult which persists, give the laboratory tests which would aid in establishing the diagnosis.

9. State the significance of each of the following: (*a*) Jacksonian epilepsy, (*b*) choked disc, (*c*) Bell's palsy, (*d*) nystagmus, (*e*) Argyll-Robertson pupil.

10. Name three localized lymphatic glandular enlargements and give causes for each.

SYMPTOMATOLOGY, DIAGNOSIS, TOXICOLOGY AND MEDICAL JURISPRUDENCE.

1. Enumerate the symptoms diagnostic of typhoid fever. Name one disease with which it may be confused and differentiate them.

2. Enumerate the symptoms of cancer of the stomach. Differentiate it from cholecystitis.

3. Enumerate the symptoms of lobar pneumonia and differentiate it from acute pleurisy with effusion.

4. Enumerate the symptoms of scarlet fever. Name two sequelæ which may follow and describe the symptoms of each.

5. Enumerate the symptoms diagnostic of acute alcoholism. Differentiate it from uremia.

6. Differentiate the secondary eruptions of syphilis from other skin lesions.

7. Differentiate acute inflammatory glaucoma from iritis.

8. Enumerate the symptoms of chronic laryngitis. Differentiate it from laryngeal tuberculosis.

9. Enumerate the symptoms of ptomaine poisoning. Differentiate it from other forms of gastroenteritis.

10. Name four conditions of a pregnant female in which a physician would be justified in causing premature birth. What are his duties from a medicolegal standpoint?

OBSTETRICS AND GYNECOLOGY AND PHYSIOLOGICAL CHEMISTRY.

1. Given a patient eight weeks pregnant with a retrodisplaced uterus: How would you distinguish the displacement? What are the possible results? How would you manage the case?

2. Given a case of labor with a prolapsed cord: What are the possible results? How would you manage the case? How would you treat the child after delivery?

3. Given a patient six hours in labor who has begun to bleed freely: What are the possibilities in the case and how would you differentiate between them? How would you treat any two of the possible conditions?

4. Given a patient with persistent itching about the vulva: Name four common causes for the condition. Give the local treatment.

5. Name four abdominal enlargements (as large as pregnancy at the seventh month) other than pregnancy. Differentiate them one from the other.

6. Name the more usual bacteria which cause puerperal fever, together with the methods of their introduction into the birth canal. Name the results that may occur from their presence and the prevention of these possible results after the introduction of the bacteria.

7. Should you be called upon to deliver a woman at full term of pregnancy discuss the status of the use of (*a*) the vaginal douche; the use of (*b*) an anesthetic; the use of (*c*) ergot; the use of (*d*) pituitrin.

8. Discuss the thyroid gland from the chemical and physiological standpoints and state the effect of any change in equilibrium of the essential constituent.

9. Describe a test for each of the following patho-

logical urinary constituents: (*a*) Bile; (*b*) blood; (*c*) acetone.

10. What is cholesterol (cholesterin)? Where is it found normally and in what pathological conditions is it of importance?

ANATOMY AND SURGERY.

1. In a patient upon whom an abdominal operation is to be performed, what local and general preparation would you advise?

2. In posterior luxation of the hip joint: Give method of reduction, with anatomical and mechanical reasons for manipulations employed.

3. What conditions may cause gangrene of the leg? State indications for and against the amputation of a leg in which gangrene has occurred.

4. Name the more usual localities in which carcinoma appears. State the more usual early symptoms present.

5. What surgical conditions may cause hematuria? Give the special symptoms of any one surgical condition capable of causing hematuria, and outline the surgical procedure for its correction.

6. What blood vessels may be involved in severe epistaxis? Describe methods of controlling severe epistaxis.

7. In fractures of the bones of the forearm, state three forms of splints that may be employed. Indicate location of fracture in which you would employ each, with anatomical reasons for the selection of the same.

8. Enumerate the conditions that would warrant the amputation of a leg. Outline the technic of amputation of the leg (upper third). State the anatomical structures severed.

9. For what conditions may resection of the elbow joint be performed? Outline the technic of the operation, giving the surgical anatomy of the parts.

10. Enumerate the various forms of hernia found in the groin. Upon what is the anatomical classification based? Describe a method of reducing by taxis in any one form selected, naming the form selected. Briefly outline the anatomical points to be considered in the radical operation for femoral hernia.

PRACTICE, MATERIA MEDICA, THERAPEUTICS AND HYGIENE.

1. Give the medicinal and dietetic treatment, and state your reasons therefor, of a case of vomiting of pregnancy.

2. Outline in brief the effects of the excessive use of: (*a*) Coffee, (*b*) tea, (*c*) chocolate, (*d*) alcohol, and (*e*) tobacco.

3. Describe the therapeutic action of: (*a*) Cocaine, of (*b*) veratrum viride, and of (*c*) apomorphine.

4. Outline the treatment of a case of pneumonia: (*a*) during the onset, (*b*) during the height of the disease, and (*c*) during convalescence.

5. (*a*) Describe the administration of spinal anesthesia. (*b*) What are the dangers of ether or chloroform anesthesia? (*c*) What precautions would you take in furtherance of their avoidance?

6. Outline the medicinal and dietetic treatment of chronic constipation. Describe any other means or measures you consider of importance in such a condition.

7. How would you combat therapeutically: (*a*) Excessive cough in tuberculosis? (*b*) a paroxysm of angina pectoris? (*c*) puerperal eclampsia?

8. Describe the local effects produced by a solution of: (*a*) Atropine sulphate, and of (*b*) pilocarpine hydrochlorate when dropped into the eye. What strength of the solution of each would you prescribe for the usual purposes for which they are used? What are the contraindications to the use of each?

9. State what articles of diet you would prohibit and what ones you would permit in a patient with arteriosclerosis and high blood pressure. What benefits would you expect from a reduction in weight of the patient?

10. How would you treat, other than by operative measures, abdominal ascites and the general edema occurring as a complication in hepatic and renal disease?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

PENNSYLVANIA BUREAU OF MEDICAL EDUCATION AND LICENSURE.

PHYSIOLOGY, PATHOLOGY AND BACTERIOLOGY.

1. *Two bacilli that are apt to attack the respiratory tract:* The bacillus diphtheriæ and the bacillus influenzæ.

Lesions. In *diphtheria*, the false membrane may be found on the fauces, larynx, pharynx, trachea, or other mucous membrane. This membrane consists of a network of fibrin which enmeshes round cells, connective tissue cells, streptococci and the specific bacilli; in the fauces and nares the membrane is adherent. The superficial layer of epithelium is necrosed, later on

the deeper layers suffer in the same way, the zone of inflammation extends, and the membrane becomes a mass of dead cells undergoing hyaline degeneration and mingled with fibrin. In *influenza*, there is an inflammatory swelling with hyperemia of the nasal mucous membrane and sometimes of the nasal sinuses and trachea and bronchi; the latter may be covered with muco-pus.

The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella, are nonmotile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline methylene blue.

A sterile swab is rubbed over any visible membrane on the tonsils or throat, and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appear as short, thick rods with rounded ends; irregular forms are characteristic of his bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts. *Methods of culture:* The bacillus of diphtheria grows upon all the ordinary culture media, and can be readily obtained in pure culture. Loeffler's blood serum, particularly with the addition of a little glucose, is an admirable medium for the rapid growth of this bacillus. The medium should be alkaline and not less than 20° C. *Method of staining:* It stains with any aqueous solution of an aniline dye, and quite characteristically with Loeffler's alkaline methylene blue. Neisser's stain is also recognized. The bacilli also stain well by Gram's method.

The bacillus of influenza is a very small bacillus, generally found in pus cells in the nasal or bronchial secretions; it is Gram negative, and stains more deeply at the ends than in the middle; the colonies are small, discrete and transparent.

2. On *entering the stomach* the food is already crushed, mixed with saliva, and reduced to a pulp; it is rendered slightly alkaline, and a small amount of the starch has been converted into maltose; the proteids and fats are unaltered. *In the stomach*, where the contents are rendered acid, conversion of starch into sugar ceases, connective tissue of fats is dissolved, and fats are set free. Proteids are dissolved and peptones formed. The albuminous foods are dissolved for the most part, and a grumous mixture of peptones, liquid fats, and starches is formed, which is termed chyme, and is gradually passed through the pylorus into the intestine. The contents of the stomach at the close of gastric digestion are: Water, inorganic salts, acidified proteids, peptones, liquid fats, starch, cellulose, and the indigestible residues of various foods.

In *gastric carcinoma* there may be noted absence of free hydrochloric acid, presence of lactic acid, and presence of Boas-Oppler bacillus. In *gastric ulcer*, there is excess of free hydrochloric acid generally, and blood is often present; lactic acid and the Boas-Oppler bacillus are not present.

3. Hypertrophied lymphoid tissue in the pharynx may result in: Mouth-breathing; snoring; open-mouth; a vacant, dull expression of the face; modification of the voice (nasal twang), with inability to pronounce certain letters. Earache and other ear affections; mental deficiency; frequent attacks of coryza; nose-bleed; stunted growth; convulsions, laryngismus stridulus, and various other neuroses may also be noticed.

4. In a general way, it may be said that if pus appears in the first part of the urine, it is from the urethra; if it appears in the last part chiefly, or at the end of urination, it is from the bladder; if the pus and urine are mixed, the pus probably comes from the kidney. Further, if the pus is from the bladder, the urine is more or less alkaline; if from the kidney or from some outside source, it is usually acid. By the use of a cystoscope, urethroscope or ureteral catheterization, the lesion may be located; a sound may detect a vesical calculus; *x*-ray examination may show lesion in kidney, and a bacteriological examination of the pus may also aid.

5. The normal body temperature is *regulated* and *maintained* by the thermotactic centers in the brain and cord keeping an equilibrium between the heat gained or produced in the body and the heat lost.

Heat is produced in the body by: (1) Muscular action; (2) the action of the glands, chiefly of the liver;

(3) the food and drink ingested; (4) the brain; (5) the heart; and (6) the thermogenetic centers in the brain, pons, medulla and spinal cord.

Heat is given off from the body by: (1) The skin, through evaporation, radiation, and conduction; (2) the expired air; (3) the excretions—urine and feces.

Increase of body temperature may indicate the presence of infectious diseases, toxemias, inflammation, or some interference with the nerve mechanism of heat regulation.

Decrease of body temperature may indicate wasting diseases, starvation, alcoholism, convalescence from fever, poisoning or collapse.

6. In *tabes dorsalis* the posterior columns of the spinal cord and the posterior nerve roots are involved. The posterior columns of the spinal cord are gray and shrunken, and show considerable overgrowth of connective tissue in the columns of Goll, Burdach, and Lissauer; this process extends upward from the lumbosacral region; the posterior nerve roots degenerate and become atrophic. The meninges over the affected parts become opaque and adherent. Some of the cranial nerves may also atrophy, notably the optic, but also the motor oculi and vagus. The process is destructive and progressive; it is not a simple wasting, although the nerve fibers are atrophied, but it is characterized by irritation, changes in the axis cylinders, overgrowth of the connective tissue, and sometimes congestion; the spinal ganglia may be affected.

In *apoplexy* "the primary effects are tearing and compression of the brain-substance. If the patient does not die immediately, softening occurs. As a result of the staining by the retained hemoglobin the area is known as red softening. Shortly after the blood escapes it undergoes coagulation, forming a cerebral hematoma. This acts as a foreign body, and sets up an inflammatory reaction, with more or less hyperplasia of the surrounding neuroglia. The fluid portion finally becomes absorbed, the corpuscles broken down, and the pigment liberated, which stains the walls of the cavity. Occasionally a cyst filled with a clear fluid may form. If all fluids are absorbed, the walls of the cavity may come in contact and a scar result." (McConnell's *Pathology*.)

In *tabes dorsalis* the disturbance of function includes loss of sensation in the feet, girdle sensation, loss of coordination of muscles, inability to preserve the erect position with the feet together, impairment of vision, Argyll-Robertson pupil, abolition of patellar reflex,

muscular atrophy, loss of sexual power, and paralysis.

In *apoplexy* the disturbances of function depend on the site of the lesion; if this is above the first cervical segment of the pyramidal tract, there will be paralysis of the opposite side of the body; if above the middle of the pons, paralysis of the lower portion of the face on the opposite side is also produced; if below this point, paralysis of the same side. Monoplegias are likely to occur if only a small portion of the fanlike projection-fibers of the pyramidal tract is involved. such as would be produced by a lesion in the cortex or in the centrum ovale. Spasticity arises in the muscles; subsequently their nutrition is impaired, and they contract. Amnesia or aphasia will occur if the lesion is in those portions of the cortex which have to do with speech. Lesions of the optic tract posterior to the chiasm cause hemianopsia. (From Stengel's *Pathology.*)

7. A clinical laboratory should be provided with a sink, running water, gas, electric light, tables, benches, stools, shelves, reagents, test tubes, beakers, slides, coverslips, microscope, centrifuge, apparatus for estimating hemoglobin and counting blood corpuscles, Petri dishes, flasks, pipettes, litmus paper, distilled water, Bunsen burner, alcohol lamp, burettes, holders for burettes and test tubes, stomach tube, urinometer, ureometer, Esbach's albuminometer, funnels, tripod, wire gauze, sphygmomanometer, incubator, thermometers, steam sterilizer, thermoregulator, platinum wire loops, pure culture of typhoid bacillus. The work which can be done will depend on the size and equipment of the laboratory, the number and experience of the workers, and the time that can be given to such work. It should include uranalysis (at least qualitative and microscopic); examination of gastric contents, and sputum; blood examinations (counting corpuscles, estimating hemoglobin, and searching for parasite of malaria); Widal's test; examination of smears for gonococcus; examination of blood for anemia, chlorosis, leucemia, and the *Treponema pallidum;* estimation of blood pressure; examination of feces for parasites, protozoa, bacteria, and occult blood; cerebrospinal fluid; milk, and various bacteriological methods (such as sputum for tubercle bacillus, nasal secretion or smear from throat for diphtheria bacillus). Wassermann's reaction and Noguchi's reaction may also be included.

8. *Irregular fevers* are of a negative character, and indicate the absence of any febrile disease which has a characteristic temperature curve, such as malaria,

typhoid, pneumonia. Some other symptom will have to be taken as a guide, and the laboratory tests (sputum, urine, cerebrospinal fluid, and blood) will have to follow such indications as these other symptoms supply.

9. *Jacksonian epilepsy* may indicate: Tumor, softening, abscess, hemorrhage or injury of the brain; general paresis; uremia; it may occur as a sequel to hemiplegia in children.

Choked disc may occur in: Retinitis, tumors of cerebrum or cerebellum, cerebral abscess, tuberculous meningitis.

Bell's palsy may occur in rheumatism and as a result of infection or exposure; it may be found in cases of multiple neuritis or locomotor ataxia, and may follow ear disease and injuries to the petrous portion of the temporal bone.

Nystagmus may indicate: Irritation of the ocular muscle centers, cataract, errors of refraction, optic atrophy, epilepsy, neurasthenia, hysteria, chorea, tumors of brain, Friedreich's ataxia, locomotor ataxia, and chronic hydrocephalus.

Argyll-Robertson pupil may signify: Locomotor ataxia, intracranial syphilis, and general paralysis of the insane.

10. Enlarged lymphatic glands *in the neck* may be due to: Inflammation, tuberculosis, syphilis, Hodgkin's disease, leucemia; *in the groin*, the cause may be: Syphilis, gonorrhea, chancroid, Hodgkin's disease, tuberculosis, malignant disease; *in the axilla*, the cause may be: malignant disease or suppuration in the breast.

SYMPTOMATOLOGY, DIAGNOSIS, TOXICOLOGY AND MEDICAL JURISPRUDENCE.

1. TYPHOID FEVER. *Symptoms:* Insidious onset, weakness, headache, epistaxis, vague pains. The temperature rises gradually, about 2° in the evening, falling 1° in the morning. Diarrhea, tenderness in the right iliac fossa, enlarged spleen, and a characteristic rash which appears from seventh to twelfth day. During the second week the temperature remains at a uniform level; typhoid state and delirium may be present. The pulse becomes rapid, weak, and dicrotic; the heart sounds are feeble; the tongue is coated, fissured, and tremulous; sordes appear on the teeth; the abdomen is distended; the stools are yellowish and offensive (said to be like pea soup); the Widal reaction may be positive. In the fourth week the temperature becomes normal.

It may be confused with malarial (remittent) fever.

The following table is taken from an elaborate one by Thayer:

TYPHOID FEVER.	MALARIAL (REMITTENT) FEVER
Blood shows no leucocytosis; eosinophiles diminished or absent; serum causes agglomeration of typhoid bacilli; malarial parasites and pigment absent.	Blood shows no leucocytosis; eosinophiles not notably diminished serum does not cause agglomeration of typhoid bacilli; malarial parasites and pigmented leucocytes present.
Fever uninfluenced by quinine.	Fever disappears under quinine.
Usually epidemic; prevailing commonly in cities.	Is an endemic disease occurring particularly in rural districts; rarely epidemic.
Anemia absent, excepting in later stages.	Anemia more or less marked early in the course.
Characteristic roseola.	No characteristic exanthem; urticaria not uncommon.
Has a fairly characteristic course.	No distinct course.
Urine high-colored; bile absent; Ehrlich's diazo-reaction present during the height of the process.	Urine high-colored; may show a trace of bile; Ehrlich's diazo-reaction rarely present.
The temperataure does not reach 40° C. (104° F.) before the third or fourth day.	The temperature may arrive at 40° C. (104° F.) within twenty-four hours.
The apathetic expression of the face, the dryness of the tongue, and sordes upon the teeth are well marked and progressive.	These symptoms are not very marked.
Herpes rare.	Herpes common.

2. *Symptoms of cancer of the stomach.* It does not usually occur before forty years of age, is more common in males, the pain is localized and constant, vomiting is copious and occurs some time after eating; the vomitus contains "coffee ground" material; hemorrhages are common; a tumor may be palpated, and examination of the gastric contents shows absence of free HCl and presence of lactic acid; severe anemia and cachexia are also present.

Cholecystitis is not accompanied by the "coffee

ground" vomitus, and the gastric contents do not show lactic acid or absence of free hydrochloric acid. Further, there may be obstinate constipation and jaundice; the pain is at first more diffuse, and bears no relation to the time of eating.

3.

PLEURISY WITH EFFUSION.	LOBAR PNEUMONIA.
Onset marked by chilliness persisting for a few days.	Onset acute, with rigor, lasting one hour or longer.
Cough is irritating; no expectoration, or, if present, catarrhal in character.	Cough more marked, and accompanied by rusty or bloody, tenacious expectoration.
Sputum negative; tubercle bacilli rare.	Dense aggregations of pneumococci present.
Moderate fever of continuous type; declines by lysis.	Fever, 102° to 104° F.; falls by crisis.
Prostration moderate.	Prostration extreme.
Unilateral distention of the thorax.	Absent.
Countenance pale and anxious.	Mahogany-colored flush of cheeks.
Limited expansion at base of chest on the affected side.	Degree of expansion slightly, if at all, inhibited.
Tactile fremitus diminished or absent.	Increased over area of consolidation.
Interspaces bulging at base of chest.	Absent.
Percussion shows flatness, with great resistance to the plexiometer finger.	Dullness with less resistance, and sometimes a tympanitic note.
Diminished or absent breath-sounds over effusion the rule. Respiration murmur diffuse, distant, and generally unaccompanied by rales. Bronchial breathing may be present over the entire affected side of the chest.	Harsh bronchial breathing and presence of rales in first and third stages, unless a bronchus is plugged.
Friction sound heard in early and late stages.	No friction murmur; rales present.

(Anders and Boston's *Medical Diagnosis.*)

4. SCARLET FEVER. *Symptoms:* Abrupt onset, with rigors, vomiting, sore throat, anorexia, rise of temperature on first or second day to 100° to 104° F. On first or second day a typical scarlet rash appears, on a red background; after a few days desquamation commences, and the epidermis peels off in large flakes.

Two sequelæ: Nephritis and inflammation of the middle ear.

Nephritis is indicated by the presence of urine of a high color and containing albumin, blood, and casts; dropsy of ankles or eyelids or general; and possibly uremia, with convulsions or coma.

Otitis media is indicated by pain in the ear, tinnitus, difficulty in hearing, swelling in the ear; the membrane presents a glistening red and sunken appearance; suppuration may occur, with perforation of the membrane, and possibly facial paralysis or meningitis.

5.

UREMIC COMA.	ALCOHOLIC COMA.
Deep coma. Slow onset unless convulsions have preceded the coma.	Can be aroused by supraorbital pressure unless very profound.
Albuminuric retinitis.	Pupils normal or somewhat dilated.
Pulse rapid.	Pulse more rapid than normal and full.
Respiration, frequent and irregular.	Regular respiration.
Urine shows albumin, casts and low urea percentage.	Normal.

6. The secondary skin eruptions of syphilis are polymorphic in character, do not itch, are roughly symmetrical, are of the color of copper or raw ham, are painless.

7.

	GLAUCOMA.	IRITIS.
Age	Over forty.	Any.
Tension	Plus.	Normal.
Congestion	General, especially scleral.	General, especially circumcorneal.
Cornea	Cloudy and steamy surface.	Cloudy.

	GLAUCOMA.	IRITIS.
Anterior chamber	Shallow.	Unchanged.
Pupil	Dilated, oval.	Contracted, synechiæ.
Pain	Severe, continuous.	Especially at night.
Vision	Much reduced.	Somewhat reduced.

(From Alling and Griffin's *Diseases of the Eye and Ear.*)

8. The *symptoms of chronic laryngitis* are: Hoarseness and discomfort in the use of the voice, a tendency to cough, and possibly aphonia.

Laryngeal tuberculosis has, in addition, dysphagia with severe pain as an additional symptom. Further, the laryngoscope will show tuberculous ulcers.

9. The *symptoms of ptomaine poisoning* are: Onset more or less sudden, abdominal pain, persistent nausea and vomiting, chill, diarrhea, headache, weakness, vertigo, faintness, neuromuscular pains, sometimes fever.

In other forms of gastroenteritis, the vomiting ceases when the stomach is emptied, but in ptomaine poisoning the nausea, retching, and vomiting are persistent; in gastroenteritis the onset is less sudden, and the symptoms not so severe.

10. Four conditions which may justify the induction of premature labor: Certain pelvic deformities; toxemia of pregnancy; habitual death of a fetus toward the end of pregnancy, and when the mother's life is in imminent danger owing to the presence of disease of the heart or kidney.

The physician must obtain the consent of the woman or of her husband or guardian, and he should be sustained in his view by a recognized consultant.

OBSTETRICS AND GYNECOLOGY AND PHYSIOLOGICAL CHEMISTRY.

1. At eight weeks, the retrodisplaced uterus will cause pain and difficulty in micturition, owing to the pressure of the cervix on the bladder; similarly, pressure of the fundus may cause pain in the sacrum and constipation; vomiting, and other reflex phenomena may occur; the cervix is found higher up than usual, and the body of the uterus is in Douglas' pouch. The condition may right itself (spontaneous reposition), or the uterus may become incarcerated, or spon-

taneous abortion may occur. The patient should be placed in the knee-chest position, and the bladder being empty, the uterus should be replaced by the physician's fingers or a repositor; it should be kept in place by adequate tampons or pessary. Incarceration is not likely to occur till the third month.

2. The possible results of a prolapsed cord are compression of the cord causing death of the fetus, and for the mother, hemorrhage due to premature detachment of the placenta and breast complications due to the death of the fetus.

Treatment of prolapsed funis consists in: (1) Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor; (4) speedy delivery, by forceps or podalic version. If the child shows signs of asphyxiation, the various methods of artificial respiration should be tried and persisted in.

3. The possibilities are: Placenta prævia, premature detachment of a normally placed placenta, rupture of the uterus, and lacerations of the lower part of the birth canal.

In *placenta prævia*, the hemorrhage is abrupt, painless, and there are generally repeated hemorrhages of increasing severity; the placenta may be felt through the cervix.

In *premature detachment*, the hemorrhage is sudden, and is generally attended with sharp pain; the hemorrhage persists until the uterus is emptied or the patient dies; vaginal examination shows nothing abnormal.

Ruptured uterus is announced by a sudden, acute, and persistent pain. Sometimes the sound of the rupture is heard by the patient; the symptoms of internal hemorrhage and shock are present—collapse, air-hunger, cyanosis, rapid, feeble pulse; the uterine contractions cease. Vaginal examination shows that the presenting part of the child has receded from its former situation owing to escape of the fetus (partially or completely) through the rent into the abdominal cavity, where it may be felt by abdominal palpation.

Treatment of placenta prævia, at term: (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the

membranes, and if there is an unfavorable presentation turn the child and make the breech engage in the os; or, if the head presents forceps may be used if speedy delivery is necessary. The strength of the woman is then the main point to be cared for, and if in a reasonable time the uterus seems to be incompetent, the child may be delivered by art. In some cases of central placenta prævia, where rapid delivery is required, cesarean section may give good results for mother and child. (Landis' *Obstetrics.*)

Treatment of rupture of the uterus: "After rupture has occurred, especially if it be 'complete' and extensive, and the child should have escaped, wholly or in great part, through the rent into the abdominal cavity, laparotomy should be done at once, child, placenta, blood clots, etc., being removed through the abdominal incision; the peritoneal cavity cleansed with hot saline solution; the rent in the uterus repaired by suture; or in case of an infected uterus, or one that will not contract, or in which the rupture cannot be well secured, the entire uterus should be removed." (King's *Obstetrics.*)

4. Pruritus vulvæ may be *caused by:* Parasites; diseases of the vulva, as inflammation, edema, vegetations, congestion, irritating discharges, lack of cleanliness, diabetic urine; it may also be of nervous origin or idiopathic. *Local treatment* consists in applications of solution of bichloride of mercury, 1:2000; or carbolic acid, 1:100; or lead and opium; dusting powders of bismuth subnitrate, calomel, or zinc oxide are also useful.

5. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ascites: Absence of the signs of pregnancy; the abdomen is distended, but the shape varies with the position of the patient; on lying down there is bulging at the sides, the tumor fluctuates, and percussion shows dull-

ness in the flanks, with resonance in the median line, but the dullness varies with the position of the patient.

Fat: Absence of signs of pregnancy, also of fibroid, or ascites.

Pseudocyesis: The uterus is not enlarged, and the administration of a general anesthetic causes the collapse of the "tumor."

6. The *bacteria which cause puerperal fever* are: Streptococcus pyogenes, staphylococcus pyogenes aureus, gonococcus, bacillus coli communis, bacillus diphtheriæ, bacillus typhosus. They are generally introduced by the fingers of the physician or nurse, or by instruments, or general lack of cleanliness. The results are shown by chill; rapid rise in temperature, to about 103° or 104°, higher in the evening than in the morning; sweats; rapid pulse; depression; dry tongue; anorexia; carphologia; scanty, high-colored, albuminous urine; restlessness; sometimes delirium or coma. The uterus is large, and tender; the lochia are diminished or suppressed; the milk secretion is often suppressed; pain in the abdomen; peritonitis may develop. *Treatment:* Prophylaxis is of the greatest importance. Purgatives; vaginal douches; some recommend curettage, others decry it; the introduction of antiseptics into the uterus; supportive and general treatment are indicated; specific sera and vaccines have been recommended by some.

7. *Vaginal douches* should not be given unless distinctly indicated, such as in cases that are probably septic or prior to version or forceps or other operative procedure.

Anesthetics are used in labor to lessen suffering produced by labor pains; to lessen the pain attending obstetric operations; to relax the uterus when its rigid contraction interferes with version; to promote dilatation of the os uteri; to reduce excessive nervous excitement which may interfere with progress of early stage of labor; to relieve eclamptic convulsions and mania; in cases of uterine inversion to relax the constructing cervix and so facilitate replacement; in bipolar version to lessen pain of introducing the hand into vagina; in precipitate labor to suspend action of voluntary muscles and retard delivery; in all cutting operations upon the abdomen; and sometitmes in sewing up a lacerated perineum when many sutures are required. (From King's *Obstetrics.*)

Dangers: They lessen the efficiency of the uterine contractions; predispose to postpartum hemorrhage; and, if given too freely, may be followed by headache, nausea, and vomiting.

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with the blood supply, includes senile, presenile, diabetic, post-febrile, Raynaud's, ergot gangrene, ainhum, gangrene from embolus, ligature of the principal artery of a limb, thrombosis of an artery, the result of injury, and obstruction of the principal artery and vein; (2) *direct gangrene*, the result of trauma, includes gangrene from severe crushes, prolonged pressure, chemical injuries, the *x*-ray, frost bites, and burns and scalds; (3) *mixed* or *microbic gangrene*, in which the tissue cells are directly killed by bacterial toxins and the blood vessels occluded by thrombosis, includes traumatic spreading gangrene, and hospital gangrene.

Amputation is indicated in all cases except, perhaps, senile gangrene with marked calcareous arteries and albuminuria or general debility; (2) diabetic gangrene with pronounced acidosis or beginning coma; (3) acute infective gangrene which has already invaded the trunk or in which septicemia is present.

4. *Carcinoma* is most usually found in the breast, uterus, stomach, pylorus, rectum, ovary and testicle. The chief *early symptom* is often impairment of function, without swelling or pain, these latter occurring later. Pain is due to the involvement of nerve-endings; when ulceration occurs, cachexia becomes marked. Other symptoms depend upon the location of the lesion.

5. *Hematuria* may be caused by renal calculus, tumors or injuries of the kidneys, cystitis, vesical calculus, prostatic congestion or ulceration or tumor, traumatism of urethra, parasites (especially the *bilharzia hæmatobia*. *Symptoms of renal calculus* consist of pain in the loin, markedly increased by exercise, especially on jolting. The pain may be referred to the thigh, groin, or testicle. The colic is associated with hematuria, and often pyuria exists with frequency of micturition. The kidney may be enlarged, and tender on pressure. A large stone may exist without any symptom whatever.

The most typical symptom consists in a sudden attack of excruciating and paroxysmal pain shooting down the loin to the bladder and testis. The attack is accompanied by vomiting, faintness, and collapse. Frequent efforts to pass urine are made, but only a scanty amount of blood-stained urine is passed (strangury). The pain ceases suddenly when the calculus slips back into the pelvis or reaches the bladder. (*Aids to Surgery*).

6. The blood vessels liable to be involved in epistaxis are: The spheno-palatine and descending palatine branches of the internal maxillary artery; the anterior

and posterior ethmoidal branches of the ophthalmic, and the artery to the septum from the superior coronary branch of the facial.

Treatment.—In severe epistaxis, examine the nose by means of a head-mirror and a speculum. If a little point of ulceration is found, touch it with a hot iron. If the bleeding is a general ooze, if it is high up, or if the cautery does not arrest it, pack the nares. It may be necessary to pack one nostril or both. Pass a Bellocq cannula along the floor of one nostril into the pharynx, project the stem into the mouth, tie a plug of lint or gauze wet with Carnot's solution of salt and gelatin to the stem, and withdraw it. Hold the double string which emerges from the nostril in the hand and pack gauze wet with gelatin solution from before backward. Tie the strings together over the plug; if both nostrils are plugged, the strings from one nostril are fastened to the strings from the other. Do not use subsulphate of iron, as it forms a disgusting, clotty, adherent mass. If a Bellocq cannula is not obtainable, push a soft catheter into the pharynx, catch it with a finger, pull it forward and tie the plug to it. Remove the plug in two or three days. Do not leave it longer. It blocks up decomposing fluids and may lead to blood-poisoning. Pick out the front plug first, hold the string of the second plug in the hand, push the plug back into the pharynx, catch it with forceps, and withdraw plug and string through the mouth. (DaCosta's *Modern Surgery*).

7. In *fracture of the shaft of the radius*, above the insertion of the pronator radii teres, the forearm is placed in full supination on an anterior angular splint, in order to bring the lower fragment in contact with the upper.

In *fracture of the shaft of the ulna*, an internal angular splint is used; this immobilizes the elbow, and places the forearm in a position half way between pronation and supination, and so keeps the two bones as far away from each other as possible and thus minimizes the danger of their union by a callus.

In *Colles' fracture*, a padded Bond splint or Levis splint may be used, so that the hand is semiflexed and adducted. A pad is placed on the back of the forearm over the lower fragment, and another on the flexor surface over the lower end of the upper fragment.

8. *Indications for amputation of the leg:* Compound fracture, compound dislocation, fracture with great comminution of bone, extensive laceration, laceration of important vessels, gunshot injuries, gangrene, exten-

sive bone disease, elephantiasis, snake-bite, aneurysm; provided that these conditions are not amenable to less radical treatment.

In Sedillot's "method of *amputation of the leg* the point of the knife is entered a finger's breadth external to the spine of the tibia and carried outward, grazing the fibula, and is brought out as far as possible to the inner side; a flap three or four inches in length is then cut from within outward; the extremities of the incision are next united by an incision across the inner side of the limb, involving the skin only; any remaining muscular tissue is next divided and the bones are sawed. The long external flap is then brought over the ends of the bones and fastened to the edges of the incision on the inner side of the limb. Ashhurst modified this operation by cutting the long external flap from without inward, and made also a short internal flap in the same manner. By either method the resulting stump is a good one, with the ends of the bones covered by the tissues of the external flap." (Wharton's *Minor Surgery*).

The parts cut through in amputation at the upper third of the leg are: Skin, fascia; bones, tibia, and fibula; interosseous membrane; muscles, tibialis anticus, tibialis posticus, extensor longus digitorum, extensor proprius hallucis, flexor longus hallucis, flexor longus digitorum, peroneus longus, peroneus brevis, soleus, gastrocnemius, and the tendon of the plantaris; arteries, anterior tibial, posterior tibial, peroneal; veins, the venæ comites of the arteries, external saphenous, internal saphenous; nerves, anterior tibial, posterior tibial, external saphenous, communicans peronei, musculocutaneous.

9. *Excision of the elbow* is performed for: Chronic joint disease (generally tuberculosis); wounds; faulty ankylosis, or other deformity; disease of the articular ends of the bones; fracture dislocation; compound comminuted fracture.

"In excising the elbow joint, the forearm is slightly flexed and a longitudinal incision is begun about two inches above the olecranon process and a little to its inner side, and carried about three or four inches down in the line of the ulna; the tissues are then divided down to the bones, and the ulnar nerve is dissected from its groove behind the inner condyle of the humerus and held aside by a retractor; the tendon of the triceps is divided, and its attachment to the fascia and periosteum over the olecranon process is separated with an elevator or periosteotome and turned downward; the joint is

next opened and the lateral ligaments divided as the forearm is flexed upon the arm. The upper part of the ulna and the head of the radius are freed with a probe-pointed knife and removed with a narrow-bladed saw, care being taken in making the section of the radius to divide its neck so that the attachment of the biceps muscle is not interfered with. The condyles of the humerus are next freed and removed with a saw. In freeing the bones at the anterior portion of the joint, great care should be used to avoid injury of the brachial artery and vein and the median nerve." (Wharton's *Minor Surgery.*)

10. The various forms of hernia found in the groin are inguinal and femoral hernia.

The anatomical classification is based on the relation of the hernia to (1) the inguinal canal and inguinal rings, and (2) to the femoral opening. The former are above Poupart's ligament, the latter below it.

The forms of inguinal hernia are:

(1) *The Direct*, in which the hernia does not occupy the inguinal canal, but leaves the abdomen to the inner side of the deep epigastric artery, through the space known as Hesselbach's triangle. There are two forms of this variety: (*a*) the hernia may escape between the epigastric artery and the obliterated hypogastric artery; (*b*) or it may escape between the obliterated hypogastric artery and the outer edge of the rectus muscle.

(2) *The Indirect* or *Oblique*, in which the hernia occupies, wholly or in part, the inguinal canal. An *oblique inguinal* hernia may pass into the scrotum or labium majus, when it is called *complete;* or may be retained in the inguinal canal, when it is called *incomplete* or a *bubonocele.* Other varieties are the *congenital, infantile,* and *encysted.*

Femoral hernia leaves the abdomen through the femoral ring and descends into the femoral canal; this canal is funnel-shaped, is about half an inch in length, and ends at the saphenous opening. Its course is first vertical, then forward, then upward over Poupart's ligament. The neck of the hernia is situated at the femoral ring; to its outer side lies the femoral vein, and to its inner side is Gimbernat's ligament; in front of it is Poupart's ligament, and behind it are the pubis, the pectineus, and the public portion of the fascia lata.

"*Taxis*, or the manipulations for the reduction of a hernia, should always be gentle, and should rarely be

tried for more than five or ten minutes, because of the danger of rupture of the bowel. It should not be employed in the presence of inflammation or gangrene. Reduction is facilitated by having the patient recumbent, the thighs flexed (and that of the affected side adducted in femoral or inguinal hernia), and the pelvis raised. The administration of opium and belladonna and the application of heat or cold also are useful in securing relaxation. One hand is used to steady the neck of the sac, while with the other the hernia is compressed and pushed back into the abdomen. In direct inguinal and umbilical herniæ the pressure is backward; in oblique inguinal hernia it is upward, outward, and backward; in femoral hernia it is at first downward and inward, then upward and backward. The successful reduction of bowel is sudden and accompanied by a gurgle; omentum is forced back slowly without gurgling." (Stewart's *Surgery*.)

In addition to the points given above on femoral hernia, it must be remembered that sometimes the obturator artery arises (abnormally) from the deep epigastric artery. When this abnormal artery passes down the outer side of the crural ring, it is out of harm's way; but when it passes down the inner side of the crural ring it is very apt to be wounded in herniotomy.

PRACTICE, MATERIA MEDICA, THERAPEUTICS AND HYGIENE.

1. The vomiting of pregnancy is generally viewed as a toxemia with disordered protein metabolism and pathological conditions in liver and kidneys. The treatment then consists in diminishing the intake of protein food, and the administration of cathartics and diuretics. If the stomach rejects food, enemata may be tried. Sodium bicarbonate is useful because it hinders the production of acetone bodies and acidosis. Irrigations of the colon, particularly with solution of sodium bicarbonate, remove toxins from the colon and also supply fluid and an alkali to the body. The best food is milk, and cereals. Many drugs have been used in the past with doubtful benefit, such as: Cerium oxalate, bismuth subnitrate, iodine, bromide of potassium, citrated caffeine and chloral.

2. The *excessive use of coffee* retards peptic digestion; incites or keeps up gastric catarrh; induces muscular tremors, anxiety, nervousness, palpitation, bradycardia, heartburn, vertigo, constipation and insomnia.

The *excessive use of tea* retards digestion; causes gastric irritation and catarrh, flatulency, constipation or diarrhea, nervousness, insomnia, muscular tremors and palpitation.

The *excessive use of chocolate* may cause gastric dyspepsia.

The *excessive use of alcohol* may cause changes (chiefly cirrhotic) in the blood vessels, liver, kidneys, and other tissues; the brain and nervous system are likely to be affected by degenerative changes; it is said to be a predisposing factor in the following: gastritis, liver disorders, dilatation and hypertrophy of the heart, arteriosclerosis, aneurysm, nephritis, neuritis, apoplexy.

"The *continued use of tobacco*, by smoking or chewing it to excess, produces granular inflammation of the fauces and pharynx, atrophy of the retina, dyspepsia, lowered sexual power, sudden faints, nervous depression, cardiac irritability and occasionally angina pectoris. Used by the young it hinders the development of the higher nerve centers and impairs the nutrition of the body by interfering with the processes of digestion and assimilation. It has been credited with causing cancer of the lips and tongue, blunting of the moral sense, mental aberration and even insanity." (Potter's *Materia Medica, etc.*)

3. "*Cocaine* is a protoplasmic poison and induces complete local anesthesia. Coca leaves, when chewed, relieve hunger and fatigue and allay irritability of the stomach. The drug tends to stimulate the vagus centre, increase the pulse-rate, constrict the arterioles, and cause a marked rise in blood-pressure, though later the blood-pressure falls; the respiratory functions are at first stimulated and afterwards depressed, and under poisonous doses death occurs from asphyxia. The higher parts of the brain are at first stimulated and the muscular power greatly increased, while the various medullary centers are first stimulated and then depressed. There is primary stimulation of the spinal cord also, with exaggeration of the reflexes, and very large doses may cause strychnine-like convulsions. In the eye mydriasis is produced and accommodation impaired. Cocaine is eliminated chiefly in the urine. Cocaine is more largely employed to produce local anesthesia than any other agent; injected into the arachnoid space of the spinal cord it has also been used to cause general anesthesia for surgical operations. The preparations of coca are prescribed as stomachic tonics and in the debility of convalescence from acute diseases, and cocaine has been given internally in chorea, paralysis agitans, alcoholic tremors, and senile trembling." (Wilcox's *Materia Medica.*)

Veratrum viride: "On the skin it causes tingling, numbness and anesthesia, and, applied to the mucous

membrane of the nose and throat, violent sneezing and coughing. Internally it produces gastrointestinal irritation, prolonged relaxation of striped and cardiac muscle, reduction of arterial pressure, depression of respiration, convulsions from stimulation of the spinal cord, free diaphoresis, and reduction of temperature. As a circulatory depressant, given early, in croupous pneumonia, pleurisy, hepatitis, maniacal delirium, etc., with strong, bounding pulse and other sthenic conditions; in puerperal convulsions and the early stage of peritonitis, phlebitis and other inflammatory affections of the puerperal state; also acute rheumatism, tonsilitis, aneurysm and wounds of the head, pericardium and peritoneum." (Wilcox, *Materia Medica.*)

Apomorphine acts on the vomiting center in the medulla, hence is emetic; it increases pulse, blood pressure, and rate of respiration; it is also an expectorant. Its *indications* are chiefly those requiring a prompt emetic; also as an expectorant in bronchitis and lobular pneumonia.

4. The *treatment of pneumonia* "depends entirely on the type of case, and the condition of the patient. Routine treatment is the worst of all treatments. Answer the following questions before prescribing: Is the patient full-blooded, and is there a full bounding pulse? Is the pulse feeble, irregular, or intermittent?

"In the first case, in a young and previously healthy adult, if there be cyanosis, or signs of dilatation of the right heart, blood-letting to the extent of a few ounces may perhaps relieve the strain, but more generally treatment should be directed to maintaining the strength from the outset.

"In the latter case we can hope for nothing from a depressing treatment, so stimulants must be resorted to, such as alcohol, ammonium carbonate, egg and brandy mixture, quinine, ether, etc. The giving or withholding of alcohol depends upon its effect upon the pulse; should the pulse rate fall and the tongue become moist it may be continued. In asthenic cases, strychnine hypodermically is necessary from the outset, and normal saline may be given by the rectum or by the skin. Oxygen inhalations are used where there is cyanosis, but it is doubtful whether they have saved many lives. When there is evidence of failure of the heart (weakness of the second pulmonary sound, etc.) digitalis should be resorted to. Many prescribe it from the outset.

"The diet should consist of milk, beef-tea or broths, white of egg, and so on. The patient should be as little moved as possible, and the bed-pan must be used. As

in other fevers, an airy room and good nursing are essential.

"Remember that narcotics are not well borne in respiratory embarrassment as a rule. Chloral should be avoided, but *if pain be excessive* a hypodermic injection of morphine does *more good* than harm, notwithstanding that theoretically morphine is contraindicated. It should not be given later than the first few days of the illness. The pain may also be relieved by poultices, which, however, are of doubtful use if carelessly made, or by application of ice. Cold packs applied to the trunk only, and frequently repeated, are very useful in relieving both pain and fever. Depressant antipyretics are to be avoided.

"The results of *serum treatment* are not unequivocally encouraging, but vaccine treatment would seem to be of better promise. Where possible, an autogenous vaccine should be used." (Wheeler and Jack's *Handbook of Medicine*).

5. By spinal anesthesia is meant the employment of subarachnoid injections of cocaine or eucaine for the purpose of producing analgesia for surgical purposes. Between the fourth and fifth lumbar vertebræ is the spot usually selected. The surface is sterilized and the skin is made anesthetic by injecting into it one of Schleich's solutions. An exploring needle is then made to find its way into the subarachnoidean space, which is evidenced by the escape of some fluid. The syringe containing the cocaine or eucaine is then attached, and the anesthetic is injected. Rigid asepsis is necessary, and even then the procedure is dangerous. (*Pocket Cyclopedia.*)

The dangers of *ether* anesthesia are asphyxia (failure of respiration), and to a much less extent, heart failure. In *chloroform* anesthesia the chief danger is sudden death from reflex arrest of the heart; failure of respiration, and fall of blood pressure may also occur; delayed chloroform poisoning or toxemia is also possible.

The *chief precautions* against these dangers are: The employment of an expert anesthetist, and the use of the purest anesthetic; a thorough examination of the patient and due preparation for the operation; the elimination of all unnecessary dangers, such as undue exposure or prolongation of the operation, and having in readiness everything likely to be needed in an emergency.

6. *Treatment of chronic constipation:* "The cultivation of habits of regularity is of the utmost importance.

The patient should go to stool at the same time every day, whether there is a desire to evacuate the bowels or not, and every such desire should be immediately gratified. The diet should comprise considerable fruit and vegetables (which leave a residue). A glassful of cold water before breakfast, an orange or oatmeal at breakfast, and stewed fruits and salads at dinner subserve a useful purpose in many cases. Persons of sedentary habits are often benefited by exercise; abdominal massage is useful in some cases, and an abdominal binder is of value to those with a pendulous flabby abdomen and visceroptosis.

Drugs should be dispensed with as long as possible. Medicinal measures when necessary vary with the nature of the causal factor, which must be diligently searched for. At the beginning of the treatment it is often advisable to clear the intestine thoroughly with castor oil, a blue mass pill, or calomel, followed by a saline aperient. In many cases, the best results are obtained by a daily injection of tepid water with or without soap; in other cases injections of oil are much better; but enemas should not be too long continued. Some patients are much benefited by a saline aperient water, sodium phosphate, or other saline, taken a half hour before breakfast. Should a course of medicine be necessary, the desired results may usually be secured by the use of cascara sagrada, which has the advantage that, having been continued for some time, the dose necessary to secure a daily evacuation may be gradually reduced, and the drug ultimately dispensed with, should the patient continue habits of regularity. The pill of aloin (⅛ grain), strychnine (1/40 grain), and extract of belladonna (1/10 grain), though much abused, is very useful in many cases." (Kelly's *Practice of Medicine.*)

7. For *excessive cough in tuberculosis:* Rest, fresh air, and drugs such as creosote, guaiacol carbonate, codeine, heroine, morphine, and diluted hydrocyanic acid; the ordinary expectorants should be avoided on account of their nauseating tendencies.

In *angina pectoris:* Inhalation of amyl nitrite, and a hypodermic of morphine and atropine or inhalation of chloroform.

In *puerperal eclampsia: "The treatment of the attack* consists of the administration of chloroform by inhalation, chloral hydrate (gr. 60) by enema, and the fluid extract of veratrum viride hypodermically (gtt. 15 followed by gtt. 5, repeated frequently enough to keep the pulse at about 60 beats a minute, to control the

convulsions, and free purgation by croton oil (gtt. 2, or 3, in sweet oil or glycerin), free sweating by the hot pack, and sometimes depletion by venesection to eliminate the poison. The after-treatment consists of free purgation by the salines, restriction of diet, and later the administration of tonics and stimulants. The obstetric treatment is usually noninterference." (*Pocket Cyclopedia.*) Sometimes *accouchment forcé* is indicated.

8. *Atropine sulphate*, when dropped into the eye dilates the pupil, destroys the power of accommodation, and increases intra-ocular tension. As a simple mydriatic a solution of ¼ grain to the ounce is generally used; as a cyclopegic a solution of 4 grains to the ounce may be used. It is contraindicated in glaucoma and old age.

Pilocarpine hydrochloride, when dropped into the eye causes the pupil to contract and lessens intra-ocular tension; it may also produce spasm of accommodation. It is used in solution of 1 to 4 grains to the ounce. It is said to be contraindicated in severe cardiac or pulmonary lesions.

9. In *arteriosclerosis*, the following should be *prohibited:* All indigestible food; dried, salted or preserved meats; cheese, pastry, sweets, nuts, cabbages, carrots, turnips. The following may be *allowed:* White fish, chicken, rabbit, game, one potato a day, mutton or well-grown lamb once a day, spinach, asparagus tops, onions, tomatoes, peas, beans, water, milk, weak tea, alcohol only when necessary. Only as much food should be taken as is necessary.

If the reduction in the patient's weight is due to the lessened intake of food, we may expect diminished blood pressure, less toxemia or intoxications, and general amelioration of health. If the patient had been overweight, a reduction should be accompanied by diminution in blood pressure, avoidance of the danger of impending apoplexy, and amelioration of subjective symptoms such as headache, dizziness, dyspnea, precordial oppression.

10. Purgatives and diuretics may be of use; elaterin, in doses of 1/20 grain; compound jalap powder, 30 grains; if salines are used they should be given in concentrated or saturated solution; citrated caffeine, and pilocarpine may be of service; the external application of heat may be tried. The amount of fluid ingested should be limited, and meat and meat products should be avoided; in renal cases salt is prohibited.

STATE BOARD EXAMINATION QUESTIONS.

State Board of Medical Examiners of South Carolina.

JUNIOR ANATOMY.

1. Describe the liver and give its blood supply.
2. Describe the urinary bladder.
3. Describe the left lung and give its blood supply.
4. Describe the inferior maxillary bone.
5. Describe the formation of the brachial plexus.

SENIOR ANATOMY.

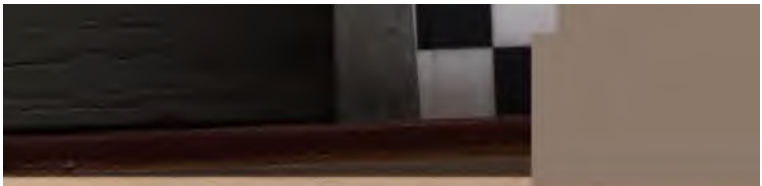
1. Name the blood vessels and nerves encountered in ligation of the brachial artery in the middle of the arm, giving their positions in relation to the artery.
2. For what anatomical reason should wounds of the scalp be closed loosely?
3. Where is the pain located when the maxillary division of the fifth nerve is affected?
4. When sarcomata wander from the seat of primary growth, where do they appear and why?
5. Describe the space that should be selected for doing a paracentesis of the pericardium and give your reason for this selection.
6. With pus beneath the thick middle portion of the palmar fascia, name the points at which the abscess is liable to point.
7. How is collateral circulation established after ligation of the common carotid artery.
8. With a hemorrhage into the pons below the point of decussation of the seventh nerve, what portions of body will be paralyzed?
9. Where, in the stomach, is carcinoma most apt to occur and why?

PHYSIOLOGY.

1. What is an enzyme? Mention one and describe its action.
2. What important centers are situated in the medulla oblongata?
3. Discuss the lymphatic system.
4. What changes occur in the course of the circulation at birth?
5. Mention the glands of internal secretion. What are the theories in regard to their respective functions?

CHEMISTRY.

1. What is the amount of CO_2 in the atmosphere and why does it not increase?



2. How does ferric hydrate act as an antidote for the poisonous properties of arsenic?
3. What are the chemical properties of HNO_3 and into the composition of what explosive does it enter?
4. What is calcium sulphate? What peculiar property renders it useful in surgery?
5. What are the diagnostic uses of electricity?

MATERIA MEDICA.

1. What preparation of iodine and mercury would you combine for internal use? what is the dose of each?
2. Name two or more preparations of digitalis and give dose of each.
3. Give dose and therapeutic effect of atropine, tr. nux vomica, Fowler's sol., arsenic, fl. ext. ergot, tr. opium.
4. Name a vasodilator, a vasoconstrictor, a hydrogogue cathartic, a cholagogue cathartic, a diuretic, and give dose of each.
5. Write a prescription in compliance with "The Harrison Anti-Narcotic Act" for a cough mixture containing codeine.

THERAPEUTICS.

What drugs would you use in treating the following diseases: Give dose, frequency, and therapeutic effect. If therapeutic agents employed other than drugs tell how they should be used.

(1) Gastroenteritis in child two years old. (2) Measles. (3) Acute catarrhal dysentery in adult. (4) Diabetic coma. (5) General anasarca accompanying cardiac insufficiency. (6) Spasmodic croup. (7) Renal colic. (8) Cholera morbus. (9) Chlorosis. (10) Scarlet fever.

PRACTICE OF MEDICINE.

1. Describe a case of Landry's paralysis: acute ascending paralysis.
2. Give etiology, symptoms, physical signs and possible terminations of pulmonary infarction.
3. Mention the causes of cardiac hypertrophy.
4. Describe a case of acute hemorrhagic pancreatitis, stating the diseases with which it might be confounded. Give their diagnostic differences. What treatment would you recommend for a case of acute hemorrhagic pancreatitis?
5. Mention the characteristic blood findings in (a) pernicious anemia; (b) myeloid leucemia; (c) lymphatic leucemia.
6. Define diphtheria. State its most frequent sequelæ.

7. A man fifty years old complains that he has a cough, dyspnea on exertion, has noticed for the past three months that his feet were swollen at night. What diseases might cause such symptoms? Briefly differentiate the diseases mentioned.

8. How would you recognize dilatation of the stomach? What are the causes and how would you differentiate them?

9. Enumerate the conditions of the kidney which may give rise to an abdominal tumor, and state how you would make your diagnosis as to its nature and origin.

10. What are the most reliable physical signs of fluid in the pleural cavity?

OBSTETRICS.

1. Name the fetal envelopes from without inward.

2. Describe the vitellus, the allantois, the amnion and its contents.

3. Describe the development of the placenta.

4. As pregnancy progresses state the important changes, physical and mental, that occur, or may occur, in the disposition and organism of the pregnant woman.

5. Describe the gross anatomy of the mammary glands, give the changes which occur in them during pregnancy, and give the management of the glands in case the infant is stillborn or if for any reason nursing is considered inadvisable.

6. Name the varieties of glycosuria that may occur in pregnancy; give their significance and management.

7. Give the etiology, symptoms and treatment of the albuminuria of pregnancy without anatomical kidney lesion.

8. Describe the conditions, mandatory and elective, under which cesarean section is done and give in general terms the method of doing the operation.

9. Diagnose a face presentation, L. M. A. position, and give mechanism and management of the same.

10. Give management of a brow presentation, R. M. P. position.

11. Name and describe the common varieties of obstetric forceps, give general indication for their use, and describe their use in any given condition that you may choose.

12. Summoned to a patient about seventy-two hours into her puerperium, and given a history of a recent chill, and present rise of temperature, with diminution of lochia, name the conditions, one of which is probably present, and differentiate between them.

N. B.—Answer any two of questions 1, 2, 3, and 4. Each of the remaining questions demands an answer.

SOUTH CAROLINA.

GYNECOLOGY.

1. Mention two common causes of hemorrhage from the non-pregnant uterus. How would you differentiate them?
2. Give the causes and treatment of retrodisplacements of the uterus.
3. Differentiate salpingitis in the right side from appendicitis.
4. Describe an operation for removal of the uterus. When is it indicated?
5. Give the causes and treatment of amenorrhea.

SURGERY.

1. Differentiate between acute synovitis of knee joint and acute osteomyelitis about joint, and give treatment of each.
2. In excision of knee joint give details of operation and after treatment. Outline flap used.
3. Describe and outline various flaps used in amputating in different regions from ankle joint to middle of thigh.
4. Make a preparative diagnosis in a woman suffering with tenderness in right side of abdomen from ribs to pelvis, with occasional paroxysms of pain; daily slight rise of fever with albumin in urine.
5. Give indications for enucleating an eyeball and describe an enucleation.
6. Describe the anesthetic state from ether and chloroform.
7. Operate for necrosis of shaft of tibia. If you found all of a section of the bone destroyed and the periosteum intact what would you do?
8. What organs and regions does a right rectus incision allow access to. Describe the technique of making the incision and the closing of it.
9. Give the varieties of hemorrhoids and give in detail the operation of removal of internal hemorrhoids by both suture and clamp and cautery methods.
10. Treat fracture, both impacted and unimpacted, in a very old person.

PEDIATRICS.

1. How would you diagnose and treat flatulent colic in an infant? What food constituent is the usual cause of this condition?
2. Give the causes, consequences and treatment of otitis media.
3. What diseases may diphtheria simulate and how would you differentiate them?

4. Give the symptoms and treatment of pertussis. What is its most serious complication?
5. Give the symptoms and treatment of acute anterior poliomyelitis.

URANALYSIS MICROSCOPY, TOXICOLOGY, AND MEDICAL JURISPRUDENCE.

1. In the examination of urine, how would you differentiate precipitates of urates, earthy phosphates and albumin?
2. Name several drugs that render the urine alkaline; give their indications and methods of administration. What class of acids would you give to acidify alkaline urine?
3. What casts are frequently found in albuminous urine and what do they denote?
4. What is hematuria? What conditions cause it and how does it appear microscopically?
5. Name four conditions in the physical organism which would modify the effects of poisonous drugs.
6. What two remedies are especially indicated in chronic lead poisoning? Describe the action in said condition.
7. How would you differentiate between true poisoning and diseases which simulate poisoning?
8. In examining vomited matter or a stomach suspected to contain phosphorus, what simple methods would show its presence?
9. How would you distinguish between intentional and accidental abortion?
10. What are the signs of death?

HYGIENE.

1. Discuss briefly artificial heating in its relation to ventilation.
2. What are the general rules for ventilating a room by providing inlets and outlets, as to size, location and number?
3. What are the sources of water supply?
4. Discuss milk as a factor in the spread of disease.
5. What diseases are transmitted by mosquitos?
6. (a) Describe the mosquitos causing malaria. (b) What measures would you adopt to destroy them?
7. (a) Discuss room disinfection. (b) Municipal quarantine.
8. What diseases threaten soldiers and civilians in the tropics?
9. If you were a surgeon of a post or camp, what measures would you adopt to prevent disease among the troops?

10. How would you deal with an epidemic of cerebro-spinal meningitis?

BACTERIOLOGY AND PATHOLOGY.

1. How do bacteria multiply? What is meant by the terms aerobic and anaerobic bacteria?
2. What are the staining peculiarities of the *Bacillus tuberculosis?*
3. Describe the *Diplococcus intracellularis.* Where is the organism found and how is it identified?
4. What are the causes, results and terminations of thrombosis?
5. Describe the microscopical structure of sarcomata and carcinomata and give the usual mode of extension of each.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF SOUTH CAROLINA.

JUNIOR ANATOMY.

1. "The *liver* is the largest gland in the body, measuring in its transverse diameter from ten to twelve inches, and its antero-posterior six to seven, and its thickest part about three inches, and weighing about from three to four pounds. It occupies the upper part of the abdominal cavity, and the right hypochondriac, epigastric, and a portion of the left hypochondriac regions. Its upper surface is convex and rests against the diaphragm and a small portion of the abdominal parietes in front. Its lower surface is in contact with the duodenum and stomach, the right kidney and suprarenal capsules, and the hepatic flexure of the colon. It is divided by the longitudinal fissure into the right and left lobes. The liver has five fissures, five lobes, five ligaments, five sets of vessels, and is inclosed in a fibrous coat, continuous at the transverse fissure with the capsule of Glisson. It is also invested by the peritoneum, except at the attachment of the coronary ligament." (Young's *Anatomy.*)

The *fissures* are: umbilical, of ductus venosus, of gall bladder, transverse, and for inferior vena cava.

The *lobes* are: right, left, caudate, quadrate, and spigelian.

The *ligaments* are: Falciform, 2 lateral, coronary, round and of ductus venosus.

The *vessels* are: Hepatic artery and veins, portal vein, and hepatic duct.

2. The *male bladder* is a musculo-membranous pouch, situated in the pelvis, behind the pubes and in front of the rectum. It has a superior surface, antero-inferior surface, two lateral surfaces, a base or fundus, and a summit or apex. It is retained in its place by the two anterior ligaments, two lateral ligaments, and the urachus; there are also five false ligaments formed by folds of the peritoneum. Internally, on the floor, is the trigone, between the openings of the two ureters and the urethra. The anterior part of the bladder is uncovered by peritoneum, and is in relation with the triangular ligament, the symphysis pubis, and the pubo-prostatic ligament. Above it is covered with peritoneum and is in relation with the rectum and small intestines. The base is in relation with the rectovesical pouch, vasa deferentia, and seminal vesicles, all of which separate it from the rectum. It is supplied by the superior, middle, and inferior vesical arteries; and the pelvic plexus of the sympathetic, and the third and fourth sacral nerves.

3. "The lung is cone shaped, with the base downwards. The apex projects upwards into the root of the neck behind the clavicle and anterior scalene muscle. Above the first rib, the first part of the subclavian artery lies in front, being separated from it by the pleura. The base is concave, resting upon the diaphragm, and following the attachment of the midriff is placed lower externally and posteriorly than anteriorly. The outer surface is convex, and corresponds to the chest wall. The inner surface is concave, corresponding in part to the convex outer surface of the pericardium. It presents about its middle, and towards the posterior part, a slit, the hilum pulmonis, where the bronchi and vessels pass in to form the root. The anterior margin is thin, and overlaps the pericardium, and presents on the left side a notch for the apex of the heart. The posterior margin is rounded, and occupies the groove by the side of the vertebræ. The left lung is smaller and narrower than the right, and is divided into an upper and lower lobe by a fissure, which passes upwards and backwards from the anterior border nearly to the root. The root consists of the bronchus, a branch of the pulmonary artery, two pulmonary veins, nutritive bronchial vessels, anterior and posterior pulmonary plexuses, lymphatic vessels and glands, all held together by areolar tissue, and covered by the pleura." (Aids to *Anatomy.*)

Blood-Supply: Left bronchial artery for nutrition.

4. *Inferior maxilla* consists of a body and two rami. The body is horse-shoe shaped and contains the lower teeth; externally it presents the symphysis, mental process, mental foramen, incisive fossa, and external oblique line; internally it presents the four genial tubercles, sublingual fossa, internal oblique line, submaxillary fossa. The alveolar border has sixteen cavities for teeth. The ramus is quadrilateral, and presents the inferior dental foramen and a spine. Above it has the coronoid and condyloid processes, separated by the sigmoid notch. The *muscles attached* are: Levator menti, depressor labii inferioris, depressor anguli oris, platysma myoides, buccinator, masseter, orbicularis oris, geniohyoid, geniohyoglossus, mylohyoid, digastric, superior constrictor of pharynx, temporal, internal and external pterygoids.

5. The *brachial plexus* is formed by the union and subsequent division of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves. The union of the fifth and sixth makes the upper trunk; the seventh forms the middle trunk, and the eighth cervical and first dorsal make the lower trunk. Each of these trunks is divided into an anterior and a posterior branch. The anterior branches, from the upper and middle trunks, make the upper or outer cord of the plexus; the anterior branch of the lower trunk becomes the lower or inner cord; the three posterior branches unite to form the posterior or middle cord. The plexus lies between the Scalenus anticus and medius. The *branches* are: (1) Above the clavicle; communicating, muscular, posterior thoracic, and suprascapular. (2) *From outer cord:* External anterior thoracic, musculocutaneous, and outer head of median. (3) *From inner cord:* Internal anterior thoracic, lesser internal cutaneous, ulnar, and inner head of median. (4) *From posterior cord:* Subscapular, circumflex, and musculospiral.

SENIOR ANATOMY.

1. In ligating the brachial artery in the middle of the arm, the following blood-vessels and nerves are encountered: The basilic vein and internal cutaneous nerve, to the inner side of the artery; the median nerve, crossing the artery from without inwards; the venæ comites, one on each side of the artery.

2. To allow for drainage and to prevent infection from spreading along the emissary veins to the meninges or intracranial sinuses.

3. *Second, or superior maxiliary branch,* supplies sensation to skin and conjunctiva of lower lid, nose,

cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior maxillary branch*, supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, lower lip and skin of the lower part of the face.

4. Metastasis is allied to embolism; small particles may be carried by the blood vessels or lymphatic channels to neighboring or distant parts of the body where they may lodge in the capillaries. Hence secondary sarcomata may appear wherever the blood vessels or lymph channels are able to carry particles of the original tumor.

5. Paracentesis of the pericardium should be done "in either the fifth or sixth interspace, and either internal to or external to the internal mammary artery. In the fifth interspace, the width is greater near the sternal border, and is the space usually chosen. In the sixth interspace, the internal mammary artery and the pleura are both further from the left sternal border, and puncture may be made more directly inward. Where sufficient width of space exists, the sixth interspace may be chosen. Puncture should, by preference, be made internal to the internal mammary artery, as the pleura is in less danger of injury, especially in the fifth space—and even in the sixth space, the puncture would have to be about one inch outside of the border of the sternum to be sure of avoiding the internal mammary artery, and then it is apt to strike the pleura." (Bickham's *Operative Surgery*.)

6. With pus beneath the thick middle portion of the palmar fascia, the abscess is liable to point above the clefts of the fingers, on the dorsum of the hand, or in the forearm.

7. After ligation of the common carotid artery, the collateral circulation is carried on as follows: "(1) Branches of the external carotid on the side tied, anastomosing with the corresponding branches of the opposite side, viz., (*a*) Facial with facial; (*b*) temporal with temporal; (*c*) occipital with occipital; and (*d*) superior thyroid with superior thyroid. (2) Anastomoses between the internal carotids of opposite sides through the anterior segment of the circle of Willis—anterior cerebral of one side with the anterior cerebral of the other, through the anterior communicating. (3) Anastomoses between the subclavian and the external carotid of the side tied, viz., (*a*) The deep cervical with the princeps cervicis of occipital; (*b*) the vertebral with the occipital; (*c*) inferior thyroid with superior

thyroid. (4) Anastomoses between the subclavian and the internal carotid of the side tied, the vertebral through the basilar and posterior cerebral with posterior communicating from internal carotid. (5) Anastomoses of the ophthalmic, from the internal carotid with branches of the external carotid on the side tied, viz., (*a*) Nasal of ophthalmic with angular of facial; (*b*) infraorbital, from internal maxillary, with twigs of facial; (*c*) supraorbital and frontal, from ophthalmic, with terminations of the anterior temporal." (McLachlan's *Applied Anatomy.*)

8. Hemorrhage into the pons below the point of decussation of the seventh nerve will result in a crossed hemiplegia, there will be facial paralysis on the same side as the lesion, and paralysis of the extremities on the opposite side.

9. Carcinoma of the stomach is most apt to occur at or near the pylorus, because that is the most common site of gastric ulcer, and gastric carcinoma is most frequently found to develop in an old gastric ulcer.

PHYSIOLOGY.

1. An *enzyme* is a body produced by a living organism or cell and is capable of effecting certain chemical changes in certain bodies without itself undergoing alteration in the process. An amylolytic enzyme, such as the amylopsin of the pancreatic juice, by a hydrolytic cleavage of the starch molecule, converts polysaccharides into dextrose and maltose.

2. The *medulla oblongata* contains collections of gray matter which serve as special nerve centers for the following functions or actions: respiration, salivary secretion, mastication, sucking, deglutition, vomiting, voice, facial expression; it also contains the cardiac and vasomotor centers.

3. The lymphatic system consists of: lymphatic glands, lymph vessels, perivascular lymph spaces, the lymph canalicular system, the pericardial, pleural, peritoneal, and synovial cavities, and the lacteals.

The lymphatic circulation is, strictly speaking, not a circulation at all, since the lymph flows only in one direction, namely, toward the heart. The lymph capillaries take up any excess of the blood plasma which is not required for the nutrition of the tissues. These capillaries consist of a single layer of epithelium, and empty themselves into vessels very like the veins. The lymph vessels are well provided with valves, which are so closely approximated as to give the vessels a beaded appearance. All the lymphatic vessels, except those of

the right upper half of the body, empty into the thoracic duct, which terminates in the left subclavian vein, where the left internal jugular vein also enters. Those from the right upper half of the body discharge into the right lymphatic duct, which, in turn, empties into the right subclavian vein at its junction with the right internal jugular vein.

The forces concerned in the circulation of the lymph are: (1) The pressure of the blood in the blood-vessels; (2) thoracic aspiration; (3) muscular contractions of the voluntary muscles; (4) contractions of the intestine; (5) the action of the valves in the lacteals and lymphatics.

The *function of the lymphatic system* is to provide the tissues with material necessary to their functional activity, growth, and repair; to receive from the tissues their waste products; and to convey the products of digestion and absorption to the blood-current.

The lymph capillaries differ from the blood-capillaries, chiefly, in their larger and very variable caliber and also in their numerous communications with the lymph spaces. The lymph vessels in general have thinner coats than the blood-vessels; and the valves in the lymph vessels are much more abundant than in the veins.

4. *Changes that occur in the fetal circulation at birth:* The hypogastric arteries dwindle and close, the foramen ovale becomes obliterated, the ductus arteriosus and ductus venosus become obliterated, the umbilical vein becomes impervious, and the Eustachian valve atrophies.

5. *Internal secretions:* It is generally held now that the glandular organs, chiefly the pancreas, liver, and the ductless glands, produce a secretion, peculiar in each case to the particular gland producing it, and which is supposed to be given off to the blood or lymph, and to have some peculiar value in the general metabolism of the body. Such secretions are called internal secretions, in contradistinction to the previously known secretions, which are carried off by a duct, and are known as external secretions. Very little is definitely known of these internal secretions, but much work is being done on the subject.

The function of the spleen: The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme

is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

The function of the thyroid is not definitely settled: (1) it has some trophic function, regulating oxidation in the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances and (3) it produces an internal secretion.

The function of the thymus is not settled; it is said: (1) To be a blood-forming organ; (2) to have influence on growth and nutrition; (3) in hibernating animals it is supposed to store up materials which can be utilized during the period of inactivity.

The function of the suprarenals is not definitely settled; they produce an internal secretion which is probably necessary to life; it is supposed that they are able to destroy or remove some toxic substance produced elsewhere in the body.

Function of the pituitary gland: "The *anterior* lobe is concerned with the process of growth, hypertrophy leading to overgrowth of the skeleton, and partial removal to failure of development of the body as a whole and of the sexual glands. Extracts of the *posterior* lobe, when injected into an animal, have a direct action on plain muscle all over the body; they cause constriction of the arterioles and a rise of blood pressure, contraction of the muscular coats of the digestive tract and of the bronchioles, and contraction of the uterus. The extracts also produce an increased flow of urine, which was at first attributed to the presence of a substance having a specific effect upon the renal cells; it is probable, however, that the diuretic effect is merely an indirect result of the more rapid flow of blood through the kidney which follows the injection of the extract. Extracts of the posterior lobe increase the secretion of milk, and after the injection a larger amount of milk is formed by the animal in the course of twenty-four hours." (Bainbridge and Menzies' *Essentials of Physiology.*)

CHEMISTRY.

1. There are about four parts of carbon dioxide in 10,000 parts of air. The carbon dioxide in the air does not increase because it is being constantly removed by the plants, the chlorophyll of which (under the influence of sunlight) decomposes the CO_2, and returns the oxygen to the air.

2. The ferric hydrate changes the arsenic into ferrous arsenate, which is non-poisonous.

3. *Chemical properties of nitric acid:* When exposed to air and light, it is decomposed into N_2O_4, H_2O, and oxygen; a similar result is obtained when it is exposed to heat; it is an oxidizing agent; it destroys many organic substances; in combination with metals, it produces nitrates.

It enters into the composition of nitroglycerin.

4. Calcium sulphate is gypsum, or plaster of Paris. When mixed with water it "sets," making a hard casing; it is used in the fixing of fractures, etc.

5. *Electricity is used in diagnosis* as a means of illumination to be employed with the various "scopes" for examining the cavities of the body. It is also used in determining the reactions of degeneration. "A normal nerve or muscle will respond to any form of electric stimulation. If it is diseased, it will not respond to a faradic current, but will give an increased response to a galvanic current, but the reaction obtained will be slow and sinuous, in opposition to the quick and prompt response obtained when a nerve is normal. The usual method of testing is to first apply a slowly interrupted current to the corresponding normal nerve, and then try the same current on the diseased nerve. If the nerve is completely diseased or sclerosed, no reaction will be obtained to either current. The galvanic current is then tried and a minimum current applied to the diseased nerve first, and the response will be slow and sinuous. The same current applied to the healthy nerve will not cause any reaction, and to obtain a response it will be necessary to increase the current to such an extent that it will be painful. Reactions of degeneration are not obtained until about one or two weeks after the severance of the nerve, and should never be sought for as long as a nerve is inflamed or there is pain on pressure. Its presence makes the prognosis doubtful; its absence, good." (Anders and Boston's *Medical Diagnosis.*)

MATERIA MEDICA.

1. Hydrargyri iodidum flavum. Dose, gr. 1/5; and hydrargyri iodidum rubrum. Dose, gr. 1/20.

2. Fluidextract of digitalis, dose ♏j; extract of digitalis, dose, gr. 1/5; infusion of digitalis, dose, ℥ij; tincture of digitalis, dose, ♏xv.

3. ATROPINE: Dose, gr. 1/160.

Action: Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic

doses cause the blood pressure to fall; it stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

TINCTURE OF NUX VOMICA: *Dose,* ℥v-x.

Physiological action: Strychnine is a bitter tonic, stimulates appetite, secretion, and digestion, increases peristalsis, stimulates the vasomotor centers, and so raises arterial tension, and stimulates both accelerator and inhibitory nerves of the heart. All the functions of the spinal cord are exalted by strychnine, reflex, motor, vasomotor, and sensory. Large doses cause dilated pupils, irregular and jerky respiration, increased reflexes.

FOWLER'S SOLUTION OF ARSENIC: *Dose,* ℥j-v.

Action: It is a tonic; increases cardiac action, respiratory power, intestinal secretions, and peristalsis; produces edema, itching, diarrhea, epigastric pain, irritable and feeble heart.

FLUIDEXTRACT OF ERGOT: *Dose,* ℥xxx.

Physiological action: Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it raises the blood pressure, it increases peristalsis, and is an emmenagogue.

TINCTURE OF OPIUM: *Dose,* ℥viij.

Physiological action: It is analgesic, hypnotic, diaphoretic, narcotic, a respiratory and cardiac stimulant (later a depressant), it checks most secretions (not perspiration), it stimulates the brain, and contracts the pupil.

4. A *vasodilator:* Amyl nitrite, ℥ij-v (by inhalation).

A *vasoconstrictor:* Strychnine sulphate, gr. 1/64.

A *hydragogue cathartic:* Elaterin, gr. 1/10.

A *cholagogue cathartic:* Podophyllum, gr. viij.

A *diuretic:* Potassium acetate, gr. xxx.

5. ℞

Codeinæ sulphatis, gr. iij.
Ammonii chloridi, ʒj.
Fluidextracti glycyrrhizæ, ʒj.
Aquæ destillatæ, q. s. ad ʒij. M.

Sig.: One teaspoonful every two hours in water.

MARK TAPLEY, M.D.,
911 West Forty-Fourth Street,
New York City.

Registered Number, 23.

For John Jones (aged 30 years), 846 West 156th Street, New York.

October 26, 1915.

THERAPEUTICS.

1. *Gastroenteritis in child two years old:* Two drams of castor oil as a purgative; cool sponging or bath for fever (if present); give no food, but only boiled water or barley water for twenty-four hours. Subsequently, the diet must be properly regulated.

2. *Measles:* Isolation in a well-ventilated and darkened room; cool sponging or bath for fever; cool water to drink; if a sedative is required one grain of phenacetin may be given every three hours for four doses; if the cough is troublesome, three grains of sodium bromide may be given every three hours; inunction with 5 per cent. ichthyol in lanolin will relieve the itching; as a laxative, a quarter of a grain of calomel may be given every hour for two or three doses.

3. *Acute catarrhal dysentery in adult:* "The treatment consists of rest in bed and liquid diet. Rochelle salt (ʒ 4) or Epsom salt (ʒ 4) should be given to cleanse the bowels thoroughly. Castor oil (ʒ 1) with laudanum (gtt. 20) may be used. Pain is relieved by opium, alone or combined with bismuth subnitrate, cocaine or belladonna. Hope's camphor mixture (ʒ 2) may be administered every 3 hours. The colon may be irrigated every 2 hours with lukewarm water or starch-water containing laudanum (ʒ ½)." (*Pocket Cyclopedia.*)

4. *Diabetic coma:* "The coma is usually fatal, and little can be done to delay the result. Inhalation of oxygen has been thought of benefit, and large doses of sodium bicarbonate and other alkalies have rescued from coma by reducing the acid intoxication. Normal salt solution used by rectal irrigation, subcutaneous or intravenous injection, has proved beneficial, to the extent of delaying coma or temporarily restoring consciousness in a few instances. Sodium bicarbonate in strong solution by intravenous injection, hypodermoclysis or rectal irrigation, is worthy of more extended trial. A quart (liter) of a 1 to 2 per cent. solution may be injected slowly into a vein every six hours in a bad attack; when administered by other methods the bicarbonate should be given in increasing doses up to 100 grams (3.5 ounces) a day, or until the reaction of the urine has become alkaline." (French's *Practice of Medicine.*)

5. *General anasarca accompanying cardiac insufficiency:* "The heart balance is best restored by the administration of some preparation of digitalis such as the infusion, ʒi to ʒiv, the tincture, ♏v to xxx, or the powder, gr. i three times daily. The possibility of

doses cause the blood pressure to fall; it stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

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remove the offending particles. Should the salts move the bowels too frequently, give paregoric (3 1) and compound tincture of lavender (3 1) every 3 hours until 2 or 3 doses have been taken. Should the pain and diarrhea still continue, give the "Sun Cholera Mixture" in teaspoonful doses after each evacuation of the bowels.

9. *Chlorosis:* The bowels must be kept open with a saline laxative; fresh air, sunshine, suitable food and exercise are necessary; iron must be administered in some form, such as the tincture of the chloride, ℥x-xv after meals, or 3 or 4 grains of Blaud's mass three times a day.

10. *Scarlet fever:* The treatment is that of infectious fevers in general, and in addition: "1. *Serum treatment.*—Serum from convalescents, injected in doses up to 20 c.c., has sometimes proved successful. Good results have also been obtained with polyvalent antistreptococcic sera (*i.e.* sera prepared from several different strains of cocci). 2. The danger of spreading the disease is greatest during the desquamative period. Isolation must therefore be kept up for at least six weeks from the onset, or till all desquamation and discharges (nasal, aural, etc.) have ceased. 3. A minimum amount of nitrogenous food, to avoid irritation of the kidneys. This caution does not affect milk, which may be freely used. 4. Daily toilet, tepid sponging, or tepid baths. 5. Inunction of oily antiseptic preparations into the skin, to prevent dissemination of the desquamating scales. 6. Examine the urine daily for signs of nephritis. 7. The condition of the ears must be carefully watched." (Wheeler and Jack's *Handbook of Treatment.*)

PRACTICE OF MEDICINE.

1. *Landry's paralysis* (acute ascending paralysis) "is an acute disease characterized by palsy, beginning in the feet and ascending to other muscles of the body, finally involving the medulla. Pain and trophic disturbances are absent. The reflexes are diminished or absent, but the muscles do not waste, and the sphincters are not involved. The affection is rare and occurs most often in young male adults. The etiology and pathology are obscure. The onset is sudden and the course acute, terminating usually in death within a week, occasionally being prolonged three or four weeks. The treatment is unsatisfactory." (Hughes' *Practice of Medicine.*)

2. PULMONARY INFARCTION. *Etiology:* It is generally

due to embolism or thrombosis of a branch of the pulmonary artery. *Symptoms:* Dyspnea, dilated pupils, livid face, pleuritic pain, hemoptysis, rapid and irregular pulse; embolism of the main artery causes sudden death. *Physical signs:* None characteristic; there may be dullness on percussion, breath sounds may be feeble or harsh, and there may be crepitant or crackling rales. *Possible terminations:* The circulation may be reestablished and the blood removed; gangrene; fibroid patch, or sloughing may result; death.

3. *Causes of cardiac hypertrophy:* Obstruction to the outflow of blood such as results from valvular disease of the heart, emphysema, Bright's disease, and arteriosclerosis; excessive functional activity, such as is produced by prolonged muscular exertion, exophthalmic goiter; excessive use of tea, coffee, and tobacco.

4. *Acute hemorrhagic pancreatitis* is a disease which generally attacks adult males; it is of sudden onset, and the patient suffers intense abdominal pain; vomiting, and epigastric tenderness are also present. Collapse follows, and the patient usually dies in a few days. Medical treatment is of no avail, and surgical treatment offers but slight hope. With regard to *diagnosis*, Anders and Boston state as follows: *Summary of Diagnosis.* In all cases the diagnosis is made with difficulty, the symptoms of hemorrhagic pancreatitis closely resembling those found in other pathological abdominal conditions. The age of the patient (after middle life), the history of previous dyspepsia or of diabetes, and a possible history of traumatism to the abdomen are of considerable importance. Most characteristic, however, is the sudden onset, the deep seated epigastric pain followed by nausea, vomiting, and circulatory collapse. Cammidge's reaction and the presence of fat in the feces are also to be considered.

Differential Diagnosis. Obstruction of the Bowel: When the obstruction occurs in an aged person, the distinction is made with difficulty. (*a*) Acute intestinal obstruction is more common in the young than in the aged, and the pain is less definitely localized than that of pancreatitis. (*b*) Abdominal distention is more marked in intestinal obstruction. (*c*) Fecal vomiting, a characteristic feature of obstruction, is absent in acute hemorrhagic pancreatitis. (*d*) The temperature is normal at the onset, but soon becomes subnormal in obstruction; (*e*) indicanuria is a somewhat constant symptom in obstruction.

Acute Gastroduodenal Catarrh: (1) In this condition there is a distinct rise in the temperature at the onset.

(2) The symptoms are not sudden and the pain is of a different character, not deep seated or localized, as is the case in acute inflammation of the pancreas. Cammidge's reaction is negative, as is also an examination for fat in the feces. There is not the same degree of prostration and as marked a tendency toward circulatory collapse as are characteristic of acute pancreatitis.

5. In *pernicious anemia* there is a great diminution in the number of red corpuscles; they may fall to half a million per cubic millimeter; the hemoglobin is also diminished, but not in proportion to the corpuscles, so that the color index is above unity. Poikilocytes, microcytes, macrocytes, normoblasts and megaloblasts may be found. There is no leucocytosis.

In *myeloid leucemia*, there is an enormous leucocytosis, with an increase of eosinophiles; mast cells are present, and myelocytes are present in large numbers. There is some diminution of hemoglobin and of number of red corpuscles.

In *lymphatic leucemia* there is an enormous leucocytosis involving the lymphocytes only, which may be even 90 per cent. of the total leucocytes; there are no myelocytes, but there may be a few nucleated red corpuscles.

6. *Diphtheria* is an acute, infectious, and contagious disease caused by the *Bacillus diphtheriæ*, and characterized by the formation of a fibrinous exudate on a mucous membrane and by constitutional manifestations of toxemia. The *most frequent sequelæ* are: Paralysis (of palate, muscles of eye, face, and larynx); also cardiac and vasomotor paralysis; nephritis may also follow the disease.

7. The symptoms might be caused by cardiac weakness or disease or by renal disease. In the former case the edema begins at the feet and extends upward, and physical examination will show enlargement of the heart or murmurs. In the case of renal disease the edema begins in the face and extends downward, and an examination of the urine may throw light on the exact nature of the disorder.

8. *Dilatation of the stomach* is recognized by the characteristic vomiting occurring at intervals of several days, when large quantities of stagnant fluid and scraps of partially digested or undigested food are ejected. The vomitus is acid, and contains the *Sarcina ventriculi;* on standing, it separates into layers. The outline of the stomach (when distended) may be observed, and splashing sounds may be obtained.

The condition is due to stenosis of the pylorus,

pressure on the pylorus from tumors or gallstones, kinking of the pylorus, atony.

If a tumor is found at the pylorus, atony may be ruled out. Cancer will give cachexia, and the presence of the tumor may be detected by palpation; gallstones will give colic and jaundice.

9. The abdominal tumor may be due to floating kidney, hydronephrosis, pyonephrosis, cancer or other tumor of the kidney.

Floating kidney is accompanied by severe attacks of pain, chills, Dietl's crises.

Hydronephrosis may give few symptoms beyond dragging pain, and pressure symptoms.

Pyronephrosis shows pus in the urine, and fever.

Tumor of the kidney may give pain, emaciation, hematuria.

10. *Fluid in the pleural cavity:* There is imperfect expansion on the affected side, the intercostal spaces may bulge, the apex beat may be displaced; percussion shows dulness or flatness, which is movable (according to the position assumed by the patient). The best sign is the presence of the fluid on inserting an aspirating needle.

OBSTETRICS.

1. *The fetal envelopes from without inward:* Decidua, chorion, and amnion.

2. The *vitellus* is the yolk or germinal part of the ovum together with the substance intended for the nutrition of the embryo. The *allantois* is a fetal membrane developing from the lower part of the alimentary canal very early in fetal life; it enters into the formation of the urinary bladder and also of the umbilical cord and placenta.

The *amnion* is the innermost of the fetal membranes; it surrounds the fetus and is continuous with it at the umbilicus; it secretes the liquor amnii, and forms the sheath of the umbilical cord.

The *liquor amnii* consists chiefly of water, but contains small amounts of albumin, epithelial cells, urea, phosphates, chlorides, etc. Its specific gravity is about 1.001 to 1.008. Its source is unknown; it is probably derived from the amnion, by transudation from the maternal vessels of the placenta.

3. *Development of the placenta:* "The placenta, as a separate organ, dates from the third month of pregnancy. At this time the chorion villi atrophy over the whole periphery of the ovum, except at the point where it comes in direct relation with the true mucous membrane of the uterus—the decidua serotina. Here the

villi take on an extraordinary growth, forming buds of epithelial cells (syncytium) upon their surface, which rapidly take on the shape of new villi, thus sending out branches in every direction, into each of which a loop of blood vessels is projected. Separating the villi from one another, and dipping down to the base of the chorion between the parent stems of the villous projections, are processes of the decidua, carrying capillary loops of maternal blood vessels. Very early in the history of the ovum the arterioles of this system open directly into the intervillous spaces of the placenta, so that the placental villi are bathed directly in maternal blood. . . . It is now well established, that the placental villi imbed themselves in the soft interglandular substance of the decidua serotina, often projecting into the mouth of the small veins, and that the connective tissue cells multiply and hypertrophy around them (decidual cells). The epithelium of the uterine mucous membrane disappears, except in the glands. The chorion villi are at first covered with two distinct layers of cells; an inner layer composed of single large nucleated cells arranged side by side with distinct cell walls (Langhans' layer), and an outer layer or band of protoplasm in which are imbedded nuclei at irregular intervals (the syncytium). Both of these layers are derived from the chorion and not from the uterine epithelium or the endothelium of the uterine blood vessels. Early in embryonal life (the third month) the Langhans layer disappears and the syncytium remains as the sole epithelial covering of the villi. In the youngest ova yet observed the trophoblast contains lacunæ to which blood is conveyed from the maternal circulation by little curling arteries that wind their way up through the decidual cells to empty directly into the placental sinuses. These arteries are provided with only a delicate endothelial wall. . . . The syncytial cells of the latter have the power to penetrate the endothelium of the decidual arterioles and thus open a direct communication between the placental villi and the maternal blood. By this anatomical arrangement the fetal and maternal blood is, of course, kept separate. The former circulates within the capillary system of the villi; the latter bathes the exterior of the villi." (Hirst's *Obstetrics.*)

4. As pregnancy progresses the *uterus* becomes larger in every way, is more vascular, first sinks and then rises; the cervix becomes more vascular, softer and edematous; later the cervix becomes shorter; *vagina* and *vulva* become hypertrophied, more vascu-

lar, discolored and secrete more freely; the vulva becomes more patulous. The *blood* is increased in quantity, chiefly the fluid part and the fibrin making elements; the red cells and hemoglobin are relatively decreased, though absolutely increased; the white cells are increased. The changes in the *breasts* are described in the next answer. The *heart* is more rapid, and the rhythm and rate more easily disturbed. The *lungs* are compressed, their capacity decreased, and the breathing becomes more thoracic. There is increased secretion of saliva, indigestion, vomiting in the morning, and tendency to constipation. The *urine* varies in quantity, and may contain albumin; micturition is more frequent. The woman's *weight* increases; the *skin* becomes pigmented, chiefly on breasts, abdomen and genitals; the *teeth* may decay; the nervous system becomes more irritable and unstable, and neuralgia is apt to occur. There is apt to be change in the woman's disposition.

5. "The mammary glands are compound racemose glands, and consist of gland-tissue which is made up of lobes, and these again of lobules. The lobes are connected by fibrous tissue, and between them is fat. Each lobule is composed of sacculated alveoli and a duct, the lobular duct. The lobular ducts discharge into larger ducts, which in turn discharge into a lactiferous duct, which may be regarded as the excretory duct of a lobe. Of these ducts, there are from fifteen to twenty; and they open at the surface of the nipple. Under the areola the tubuli lactiferi are dilated, forming ampullæ, in which, during the period of lactation, the milk accumulates in the intervals of nursing. The walls of the alveoli consist of a basement membrane, covered, during the period when the gland is not active, by a single layer of flat or cuboidal cells with one nucleus and presenting a granular appearance." (Raymond's *Physiology.*)

During pregnancy the mammary glands increase in size, fulness and firmness; Montgomery's follicles become pronounced; the primary areola becomes larger and darker; the secondary areola appears; the nipple becomes larger, more prominent and more erectile; and colostrum may be expressed.

If the infant is stillborn, or nursing is inadvisable, the mammary glands should be anointed with a solution of atropine sulphate in glycerin (about 1:500); a snug binder should then be applied; the patient should be restricted to as little fluid as possible, and should receive salines to produce watery stools.

6. *Glycosuria in pregnancy:* "Sugar may be found in the urine of pregnant women in from 5 to 25 per cent. of cases after the fifth month or so. It is important to realize that there are other conditions besides diabetes which may account for this. The following four conditions may be distinguished: (1) Diabetes mellitus; (2) Lactosuria; (3) Alimentary; (4) "Idiopathic" Pregnancy Glycosuria. *True Diabetes* must be diagnosed where the condition existed prior to pregnancy, or where the glycosuria is accompanied by symptoms such as polyuria, emaciation, etc. It is a very grave complication of pregnancy, leading in many cases to premature labor, and in about a quarter of the cases to the death of the mother from diabetic coma either during pregnancy or very soon after delivery. The fetus in many cases is born dead. *Lactosuria.* If the urine gives a reaction to Fehling's or some other simple test for sugar, steps should at once be taken to find out whether the sugar is glucose or lactose. This can be done by the polariscope or the fermentation test. In the majority of cases it is lactose, reabsorbed from the milk in the breasts. In the same way lactose is found in the urine of puerperal women who do not nurse. Lactosuria is of no significance. *Alimentary Glycosuria.* This is apparently more easily induced in pregnant than in non-pregnant women. A diminution in the carbohydrates in the diet will probably lead to its disappearance. *Idiopathic Pregnancy Glycosuria.* Under this head are included unexplained cases of glycosuria in pregnancy, unaccompanied by any symptoms, and unaffected by diet. The sugar is rarely present in any quantity, and disappears shortly after labor. It is probably due in some way, not yet understood, to the altered balance in the secretions of the ductless glands." (Johnstone's *Textbook of Midwifery.*)

7. "*Albuminuria* in small amounts, at irregular intervals, has been regarded as physiological on account of its frequent presence without apparent unfavorable symptoms. The anatomical basis for this has been supposed to be the so-called pregnancy kidney, which has been described as a congestion from the pressure of the altered circulation. The safer position is to assume that any amount of albumin is pathological, provided we have the assurance that it is not due to the admixture of discharges from the external genitals. Its clinical significance may be unimportant in some cases. The amount is generally small, not even appearing in some of the severest types until late in the

disease. This may be true even in the later months in the form that terminates in *eclampsia*, in which it may suddenly appear as the attack begins. In such cases daily and even hourly examinations may be necessary." —(Jewett's *Obstetrics.*)

Eclampsia is an acute morbid condition, occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. About 75 per cent. of the cases occur in primiparæ. "*The treatment of the attack* consists of the administration of chloroform by inhalation, chloral hydrate (gr. 60) by enema, and the fluidextract of veratrum viride hypodermically (gtt. 15 followed by gtt. 5 repeated frequently enough to keep the pulse at about 60 beats a minute), to control the convulsions, and free purgation by croton oil (gtt. 2, or 3, in sweet oil or glycerin), free sweating by the hot pack, and sometimes depletion by venesection to eliminate the poison. The after treatment consists of free purgation by the salines, restriction of diet, and later the administration of tonics and stimulants. The obstetric treatment is usually noninterference."—(*Pocket Cyclopedia.*) Sometimes *accouchement forcé* is indicated.

8. *Cesarean section.*—"*Indications:* The cases in which it is performed are: (1) Extreme deformity of the pelvis, in which delivery by forceps and version is excluded, and in which craniotomy is either impossible or would be more dangerous to the mother than cutting into the abdomen and uterus; and in which there is not room for a successful symphyseotomy. Such cases present the '*positive*' indication for cesarean section; there is nothing else to be done. Flat pelves having a conjugata vera of 2¼ inches or less, and justo-minor pelves with a conjugata vera of 2½ inches or less, present this positive indication; (2) cases of more moderate pelvic contraction in which craniotomy is possible, but cesarean section is agreed upon to *save the life of the child;* (3) mechanical obstruction in the pelvis from fibroid, cancerous, bony, or other tumors which cannot be pushed up out of the way or be safely removed; (4) irreducible impaction of a *living* child in transverse presentations; (5) in women dying near the end of pregnancy the child, if alive, is rapidly delivered by *post-mortem* cesarean section; (6) various other obstructions from inflammatory adhesions, atre-

sia, constrictions, etc., of the vagina, and uterine displacements, may rarely require the operation; (7) recently the operation has been done in eclampsia cases, where more conservative methods of rapid delivery were impracticable; and (8) in placenta prævia, chiefly with a view to lessen the infant mortality attending the usual treatment of this complication."—(King's *Obstetrics.*)

Cesarean section.—"Fuidextract of ergot, ɱxx, is injected into the thigh muscles just as the anesthesia is begun. The operator assures himself that there is no loop of intestine between the uterus and abdominal wall, beneath the field of incision. Should a coil of intestine be found there, it is pushed above the fundus. An assistant holds the uterus in central position. The skin incision extends one-third above and two-thirds below the level of the umbilicus. It is best made through the right rectus muscle. The external layer of the rectus sheath is divided, the muscular bundles separated with handle of scalpel and the fingers, and the deep layer of the sheath and the peritoneum divided after lifting them with tissue forceps. Bleeding vessels are controlled by gauze sponge pressure or held by catch-forceps before opening the peritoneum. A short longitudinal median incision is made in the uterine wall beginning at the fundus, avoiding the membranes if still unbroken. This is extended downward with fingers, scissors, or scalpel to a total length of about six inches. The hand is thrust through the membranes and the child is extracted by the head or the feet, whichever is most accessible. In case of anterior implanation of the placenta, usually the hand may best be passed directly through it. The cord is clamped at two points with catch-forceps, cut between them, and the child is passed to an assistant. The uterus slips out of the abdomen as the child is extracted, and the intestines are kept back with hot sterilized towels placed over the upper part of the incision. The coverings help also to protect the peritoneum from soiling. The uterus is wrapped in hot moist cloths. As a rule, it is better not to wholly eventrate the uterus. The placenta, if not spontaneously separated, may be peeled off by grasping it with one hand like a sponge. If the cervix is not sufficiently open for drainage, a large rubber tube or gauze strip is passed down through it and withdrawn from below. Irrigating or mopping the uterine cavity is unnecessary. Asepsis is promoted by leaving it as nearly as possible untouched. The peritoneum is sponged dry with the least possible friction

or handling. The uterine wound is closed with deep No. 2 chromated catgut sutures at intervals of about 1/3 inch. They are given a wide sweep laterally through the muscular wall, falling short of the decidua. The peritoneal coat of the uterus is closed with a No. 1 continuous plain catgut suture, forming a welt over the deep suture line. The hemorrhage is inconsiderable and usually ceases with the introduction of the first sutures—a hypodermic of ergotole should be given before beginning the operation, and one of ergotole and pituitrin on the delivery of the child. Retraction of the uterus is ensured by manipulating it, if necessary, through a hot towel, or by faradism. When there has been much blood lost, a quart or two of warm sterilized 0.9 per cent. salt solution may be left in the peritoneum. The parietal peritoneum is closed with a plain running No. 0 catgut suture. Interrupted silkworm-gut sutures are then passed at intervals of about ¾ inch: through all but the peritoneum, from within outward. The fascia is brought together with interrupted No. 2 plain catgut sutures, or with a continuous suture. The silkworm-gut sutures are now tied. The abdomen is cleansed, and the wound covered with a dressing of several thicknesses of dry sterile cheesecloth; over this is placed a thick compress of sterile absorbent cotton. The dressings are secured with strips of zinc oxide adhesive plaster, and held in place by a Scultetus binder."—(Polak's *Obstetrics.*)

9. FACE PRESENTATION.—*Diagnosis:* Vaginal examination will show a high position of the presenting part, and also a mouth or nose, which should not be mistaken for a breech. In L. M. A. case the chin is directed anteriorly and to the left acetabulum; no fontanelles can be detected. Abdominal palpation may reveal the deep groove between the child's occiput and back. *Mechanism:* The successive steps are: "Extension—The head presents at the superior strait imperfectly extended, so that every case of face persentation may be said to begin as a brow presentation. There is also at first imperfect engagement of the presenting part, on account of the large diameters presented at the superior strait. Under the influence of the expulsive action of the uterus and the resistance of the pelvic walls, the brow, caught upon the pelvic brim, is held stationary, while the chin descends lower and lower by an extreme extension of the head. Molding, or an accommodation of the shape of the presenting part to the shape of pelvis, occurs to a moderate degree or not at all, because the face is a loose fit in the

normal pelvis. The molding is confined to the back of the skull. Lateral inclination is a constant feature, so that one cheek is a little deeper in the pelvic canal than the other one. Descent of the presenting part follows the dilatation of the cervical canal, the descent of the chin being accomplished almost solely by the extension of the head, and not by a descent of the head as a whole. Anterior rotation of the chin occurs as soon as it encounters the resistance of the pelvic floor. Anterior rotation is followed by the engagement of the chin under the symphysis pubis. Then follows the delivery of the head by flexion and propulsion, the mouth, nose, eyes, and forehead sweeping over the perineum and appearing successively at the posterior commissure. Restitution and external rotation follow the escape of the head from the same causes that impose those movements upon the head in a vertex presentation. The delivery of the body takes place as in a vertex presentation."—(Hirst's *Obstetrics.*)

Management: If the chin is presenting anteriorly, expectant treatment may suffice; but care must be taken to observe that the chin does not rotate backward. Spontaneous version may occur, and the presentation become a vertex one. Failing this, or as a means of favoring this, the postural treatment, such as Walcher's position, has been recommended. If, in spite of this, engagement has not occurred, cephalic version is indicated, care being taken not to rupture the membranes. If this is not successful podalic version should be tried. If, after all these manipulations, the child is still alive and the head is engaged, symphyseotomy is indicated; if the child is dead, craniotomy should be performed.

10. "*In mentoposterior positions* endeavor to secure anterior rotation of the chin when it fails to take place spontaneously. The several methods of attempting this are: 1. Press the forehead backward and upward during a pain, so as to make extension more complete, and thus cause the chin to dip lower down and touch the anterior inclined plane upon which it may glide forward. 2. Put a finger in the mouth or on the outside of the lower jaw, and draw the chin forward during a pain. 3. Apply the straight forceps and twist the chin to the pubes. 4. Apply the vectis, or one blade of the forceps, under the most posterior cheek, and over the anterior inclined plane, thus, as it were, thickening the latter, so as to make it reach the malar bone and constitute a *point d'appui* which the chin can touch and so glide forward. Should these attempts to secure ante-

rior rotation fail, an effort may be made with the hand, vectis, or fillet, to bring down the occiput and convert the face into a head presentation. In order to succeed in this maneuver the membranes should be unbroken, the os uteri dilated, the face not so deeply engaged that it cannot be lifted to or above the pelvic brim, and an anesthetic administered. Again, failing in this way to produce anterior rotation, the head, if it be not too deeply engaged in the pelvis, and have not passed through the os uteri, may be pushed back, and the child be delivered by podalic version. Should none of these methods be practicable and the head become impacted in the pelvis with the chin toward the sacrum, the only resort is craniotomy. Attempts have been made in these cases to deliver by forceps after lateral incision of the perineum, but they can only succeed when either the child is small or the pelvis over-large. Usually the child's life has been so far imperiled by delay and its consequences that craniotomy may be done without compunction. Possibly symphyseotomy may prove useful in these cases in future. In all cases of face presentation special care is necessary to avoid rupture of the perineum."—(King's *Manual of Obstetrics.*)

11. "*The obstetric forceps* is an instrument devised for grasping the fetal head in difficult labor and by traction aiding its exit. There are two varieties—namely, the simple, including the short and the long, and the axis-traction forceps. A *short* forceps is one in which the blades of the instrument are attached directly to the handles without the intervention of a shank; it possesses the cranial or cephalic curve only—that is, the outward bulging of the blades by which its accurate adaptation to the fetal head may be accomplished; this curve should be the arc of a circle, the radius of which is about 4½ inches. The *long* forceps is one in which a shank is placed between the handles and the blades for the purpose of adding length to the instrument. It has, in addition to the cephalic the pelvic curve, or upward turning of the blade, corresponding to the curve of the parturient canal. By an *axis-traction* forceps is meant a variety of long obstetric forceps in which, by an appliance or supplementary handle attached to the under surface of the blades, the traction-force is exerted in the line of the axis of the parturient canal, and, therefore, rendered more effective, while at the same time it is reduced to a minimum. Traction is effected entirely by the supplementary and not by the primary handles."—(Dorland's *Obstetrics.*)

Indications for the use of forceps are: "1. *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. 2. *Passages at fault:* Moderate narrowing 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. 2. *Passenger at fault:* A. Dystocia due to (*a*) occipitoposterior, (*b*) mentoanterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute).

Accidental complications: Hemorrhage; prolapsus funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother and child, or both." (From Jewett's *Practice of Obstetrics.*)

Manner of using forceps: "They should not be used when the os is undilated, when the head is not engaged, except in placenta prævia, when the membranes are unruptured, when the disproportion between the child's head and the parturient canal is too great, or in impossible positions and presentations. Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva; the tip is introduced into the vagina, and passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps. In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the face is swept out under the symphysis pubis."—(*Pocket Cyclopedia.*)

12. The case is one of Sepsis.

SOUTH CAROLINA.

GYNECOLOGY.

1. Two common causes of hemorrhage from the nonpregnant uterus are endometritis and adenocarcinoma. To differentiate these, microscopic examination of the scrapings may be necessary. The following table (from Dudley's *Gynecology*) may help:

GLANDULAR HYPERTROPHIC ENDOMETRITIS.	GLANDULAR HYPERPLASTIC ENDOMETRITIS.	ADENOCARCINOMA
1. Glands increased in size but not in number.	1. Glands increased in size and number.	1. Glands very greatly increased in size and number.
2. No proliferation of gland epithelium.	2. Proliferation of gland epithelium.	2. Very great proliferation of gland epithelium.
3. Gland structures nearly or quite typical in outline.	3. Gland structures more tortuous in outline.	3. Gland structures very atypical in outline.
4. Hypertrophied epithelium confined within the limits of the tunica propria.	4. Proliferation confined within the limits of the tunica propria.	4. The proliferating gland epithelium has broken through the tunica propria and is in direct contact with interglandular connective tissue, and is multiplying in an atypical manner.
5. Gland tissue does not invade muscularis deeply.	5. Gland tissue does not invade muscularis very deeply.	5. Gland tissue may very deeply invade muscularis.
6. Can trace tortuous glands.	6. Can trace tortuous glands.	6. Glandular labyrinth; can not trace tortuous and atypical gland.
7. Stroma normal in quantity.	7. Stroma decreased in quantity, but clearly defined from glands.	7. Great rarefaction of stroma, so that glands touch one another. Glands have broken through basement membrane and invaded intraglandular spaces and muscularis.

2. RETROFLEXION. *Etiology:* Tight lacing and tight clothing; congenital conditions; pressure by tumors; metrititis and parametritis with adhesions; atonic conditions of the uterus following labor, and the conditions that cause retroversion. *Treatment:* If there are no adhesions, the flexion should be corrected by digital manipulation and a pessary introduced; hysteropexy may be necessary.

RETROVERSION.—*Etiology:* Relaxation of uterine ligaments; increased weight of fundus; subinvolution;

ovarian or other tumor pressing on front of uterus; distended bladder; peritonitis or cystitis; prolonged dorsal decubitus and tight bandaging in the puerperium. *Treatment:* Remove the cause, if possible; replace the uterus and keep it in position by pessaries, tampons, and knee-chest position; pelvic massage and vaginal douches; proper hygiene, particular attention being paid to the bowels, clothing, and exercise. *Curative treatment:* The choice lies between ventral suspension of the uterus and shortening of the round ligaments.

3.—

APPENDICITIS.	SALPINGITIS.
1. No previous local disturbances.	1. Genitourinary functions previously disturbed. Usually a history of gonorrheal or puerperal infection.
2. Chill usually absent.	2. Chill may precede fever.
3. Pain in right iliac region, sudden onset, acute, and not radiating to thighs.	3. Gradual onset, pain dull, continuous, and radiating.
4. Fever of variable degree.	4. Fever often entirely absent.
5. Muscular rigidity on right side of the abdomen.	5. No muscular rigidity unless complicated by peritonitis.
6. Inflammatory exudate about appendix three to five days after onset of symptoms.	6. Inflammatory exudate in the pelvis felt by vaginal examination at the onset of the symptoms.
7. Vaginal examination is rarely painful in appendicitis.	7. Always painful in tuboovarian disease.

—(Findley.)

4. "*Indications for Hysterectomy.*—Hysterectomy is indicated if the disease is limited to the uterus. Such limitation will be inferred: 1. By the normal mobility of the uterus. 2. By the absence of any enlargement of the lymphatic glands in the parametria. 3. By the absence of the disease on the vaginal walls. Enlargement of the glands is evidence that the disease has extended beyond the uterus. This does not positively

contraindicate hysterectomy, but renders the prognosis less favorable. Whether enlarged or not the glands should, if practicable, be removed. Extension of cancer to the vaginal walls, if slight, does not definitely contraindicate hysterectomy, provided the diseased portion of the vagina can be removed with the uterus. Extensive involvement of the vagina and fixation of the uterus in surrounding cancer contraindicate the operation.

"When the disease has passed beyond the hope of radical cure, but not beyond the limits of palliative hysterectomy, hysterectomy is sometimes performed for the temporary relief of symptoms; its benefits, however, are not usually sufficient to overbalance its dangers."—(Dudley's *Gynecology.*)

Abdominal hysterectomy.—"The patient must be carefully prepared as for any other abdominal operation, but in addition the pubes and vulva must be shaved and thoroughly purified; the vagina should be douched for some days previously, and an antiseptic dressing worn, and if need be the uterine canal should be curetted and disinfected with some powerful antiseptic.

"After anesthesia has been induced the Trendelenburg position is adopted, and an incision of suitable length made in the median line. The parts are then carefully explored, and if no adhesions exist an abdominal cloth is packed in over the intestines in order to protect and keep them from exposure and injury. If adhesions to omentum or gut are present they must be carefully divided; it is, of course, most desirable that a complete peritoneal covering should be secured for any adherent organs; omental grafts may be sometimes useful in this direction. The broad ligaments are then examined, and a decision made as to whether or not the ovaries and tubes are to be saved.

"A pedicle needle carrying a sufficient length of well-boiled silk is carried through the round ligament so as to secure the ovarian artery and veins, and tied as far away from the uterus as possible. A broad ligament clamp may then be placed in position close to the uterus, so as to prevent venous regurgitation, and the broad ligament is divided half-way down. It is often possible and desirable to pick up the divided end of the ovarian artery on the face of this section and secure it separately, while the little artery which accompanies the round ligament should also be carefully secured. The ovarian artery on the other side is next dealt with in a similar

fashion. A transverse cut is now made across the front of the uterus, involving merely the serous membrane and connecting the two ends of the incisions in the broad ligaments; the peritoneum below this transverse cut is detached, together with the bladder, from the cervix, and the intraligamentary space is thereby opened up on either side. In this will be found the uterine vessels, and it may be possible to see and isolate the uterine artery before securing it by ligature. Care must be taken in this part of the operation to keep close to the uterus, as the ureter comes forward from behind under the uterine artery to reach the bladder, lying about the level of the os internum. The uterine vessels are in this way carefully secured and divided.

"The uterus is now merely held by the connection between the vagina and cervix and the peritoneal reflection in Douglas' pouch. If a supravaginal operation will suffice, the surgeon cuts across the neck of the uterus in such a way as to fashion two flaps, and finally the peritoneum behind is divided. A few small vessels will probably need to be secured on the face of the uterine stump. This having been effected, the uterine flaps are stitched carefully together so as to bury the open cervical canal; the uterine stump is then covered in by uniting the divided portions of peritoneum. This line of sutures is carried up on either side so as to secure the two layers of the broad ligament; the final result is that the pelvic floor is covered in by a continuous layer of peritoneum, showing a sutured incision which runs transversely from one side to the other. The usual peritoneal toilette follows, and the abdomen is generally closed entirely, no drainage being required."—(Rose and Carless' *Surgery.*)

5. AMENORRHEA is *physiological:* Before puberty, during pregnancy and early lactation, and after the menopause. It may also be due to: Absence or imperfect development of the generative organs; also to stenosis, obstructions, or atresia of the genital tract; also to operative removal of the uterus or its appendages. Other causative factors are: Acute infectious diseases, anemia, chlorosis, obesity, drug habits, alcoholism, overstudy, lack of exercise, exposure to cold, and various emotional causes. *Treatment* consists in: (1) Removing the cause, if possible; (2) general treatment by means of proper hygiene, rest, diet, bathing, attention to the bowels, exercise, etc.; (3) drugs reputed to be emmenagogues, such as iron, manganese, aloes, strychnine, apiol, oxalic acid, savine, rue, and tansy.

SOUTH CAROLINA.

SURGERY.

1. In *acute synovitis of the knee-joint*, the joint is swollen, tender, hot, and painful; there is a bulging on either side of the patella, and the patella is floated away from the condyles; fluctuation is felt from side to side, and the patella may be made to tap on the femur; the joint is fixed in a slightly flexed position, and movement is resisted by the patient.

In *acute osteomyelitis*, the swelling is not localized to the limits of the synovial membrane of the joint, as is the case in acute synovitis; fluctuation, if present, is not so pronounced nor is it "from side to side" behind the patella; pain is more severe, and symptoms of toxemia may be present; rigors and high fever are noticed.

In *synovitis of the knee-joint* the treatment consists in immobilization of the joint, bandaging, application of lead and laudanum lotion, ice is of use in the very early stages, later on (if pain is present) hot applications are of service; if the tension is very great leeches or aspiration may be of benefit. Later on, massage and passive movements are serviceable.

In *acute osteomyelitis* treatment must be prompt; an incision must be made through the periosteum and the pus evacuated, the surface of the bone removed, and the cavity exposed, washed out, and drained.

2. *Excision of the knee-joint.*—"A semicircular incision is to be made, with the convexity downward, commencing at the side of one condyle of the femur and passing immediately above the tubercle of the tibia to a corresponding point on the opposite condyle. This incision divides the patellar ligament, and the patella is turned up in the flap; the crucial ligaments should then be cut across, and any remaining lateral attachments divided. The limb must now be forcibly flexed and the knife carefully applied to the posterior part of the head of the tibia; a blunt pointed resection knife is best for this purpose. The articular surfaces are to be sawed off. The lower end of the thigh bone should first be removed; the division must be made accurately at right angles to the shaft of the femur, in the antero-posterior direction. A thin slice is next taken off the tibia; the section must be accurately at right angles to the shaft of the tibia. Care must be taken not to remove more of the bones than is absolutely necessary, especially in young subjects. If the patella is much diseased, it should be removed; if it is only slightly carious, it may be scraped or gouged out; if healthy, it

should be left to consolidate and strengthen the joint. But the articular surface should be destroyed to favor firm union with the femur. To keep the bones in position they should be drilled obliquely at the anterior part, and secured by two strong sutures of catgut. If the wound is septic, wire sutures are the best. Before the wound is closed all hemorrhage must be thoroughly arrested. Ligatures must be applied to the articular arteries, if necessary. The patellar tendon should be stitched in place with catgut and the wound drained for one or two days by tubes or numerous strands of silkworm gut. The limb must be kept at perfect rest for the first few weeks; a narrow, properly padded splint extending from the hip to the heel, will meet all indications. It should be fixed in position by a flannel bandage above and below the knee, over which a firm plaster of Paris bandage must be applied. An interrupted plaster splint with connecting side irons allows free access to the joints for dressing and prevents soiling of the splint. The first dressings should be changed after 24 hours. After that the dry, antiseptic wool dressings should be used, which can be left untouched for two or three weeks."—(*Cyclopedia of Medicine and Surgery.*)

3. VARIOUS FLAPS USED IN AMPUTATIONS.—*Ordinary circular amputation:* The soft parts are divided by a series of circular cuts, retraction of the parts taking place between each circular sweep of the knife, so that they are cut partly through at different levels the sawed bone forming the apex of the funnel left upon the proximal end of the limb, and the skin margin the base, the distal part removed being cone shaped.

Cuff method of circular amputation: A circular division of the skin is made, which is turned over and upward upon itself as a cuff and, upon a level with this retracted cuff of skin and fascia, the muscles are divided to the bone, generally with one circular sweep of a long knife.

Modified circular amputation: Two equal flaps, composed of skin and fascia, of varying length, and having bases equal to one-half of the circumference of the limb at their upper ends, are cut and dissected up a short distance followed by a circular sweep of the knife through the retracted superficial muscles—and by a circular sweep at a higher level through the retracted deeper muscles—and completion of the operation as in the ordinary circular amputation.

Oval method of amputation: A modification of the circular method. The skin incision is in the form of an

oval, with one of its ends more prolonged and pointed —the soft parts between skin and bone being divided by cutting from without inward—and the lips of the wound being sutured in a single line parallel with the long axis of the wound.

Racket method of amputation: A modification of the circular method. The same, in principle, as the oval amputation—with the addition of a longitudinal vertical cut prolonged from the apex of the oval forming the "handle of the racket"—thus giving a better exposure of joints without sacrifice of tissue and securing a better covering for the bone in the upper part of the wound.

Amputation by single flap of skin and muscles: A method of amputating whereby the stump is covered with a single flap derived from one aspect of a limb—and consists of skin, fascia, and muscles. Such an amputation involves the maximum sacrifice of bone.

Amputation by single flap of skin: The features of this operation are practically the same as those of the amputation by a single flap of skin and muscles, except that the covering here consists entirely of skin.

Amputation by equal flaps of skin and muscle: Coverings for the stump are gotten from two opposite aspects of the limb in the form of two flaps composed of all the soft parts covering the limb—having equal bases and lengths—and the allowance of skin being sufficiently in excess to well cover the muscles.

Amputation by equal flaps of skin: This operation is the same, in general contour and dimensions of the flaps, as the last—except that the covering here consists of skin only.

Amputation by unequal flaps of skin and muscles: Coverings are furnished by two flaps taken from opposite aspects of the limb—each flap having a base equal to one-half circumference of the limb at the saw line —and one flap having a length greater than the other. One flap usually furnishes one-third or two-thirds of the covering, and the opposite flap two-thirds or one-third—the longer flap generally coming from that aspect of the limb most thickly muscled. The flaps may bear any relation to each other in relative length —but the two flaps combined furnish a covering equivalent to 1½ diameters of the limb at the saw line.

Amputation by unequal flaps of skin: Coverings are of skin and fascia alone and are furnished by the two opposite aspects of the limb, in the form of two flaps having equal bases and unequal lengths. This amputation is identical throughout with the amputation by

equal flaps of skin, except as to the length of the flaps.

Amputation by unequal rectangular flaps of skin and muscles: The general method of performing this operation is similar, in principle, to that for amputation by unequal flaps of skin and muscles—with the exception that the flaps are rectangular (instead of rounded) and of special dimensions.

Elliptical method of amputation: This is not a distinct form of amputation. It may be considered a variety of the circular method (an oblique circular), or, equally, a variety of single flap amputation—and may be held in an intermediate position. It is circular, as to skin incision; and flap, as to its manner of covering the stump and in the suturing. The skin incision is in the form of an ellipse, or a lozenge, the upper part of the ellipse being upon one aspect of the limb and the lower part upon the opposite—the lateral limbs of the figure crossing the lateral aspects of the limb to be amputated. The idea of the ellipse is brought out by imagining the outline projected upon a flat surface.

Best methods of amputation about the leg: Oblique elliptical for the supramalleolar region. Large anterior and small posterior flaps for lower third, between supramalleolar region and lower limit of middle third. Large posterior and short anterior flaps for middle third. Large external flap for upper third. Bilateral hooded flap for "place of election," or upper part of upper third.

Best methods of amputation through the thigh: Shorter anterior and longer posterior flaps for transcondyloid region. Longer anterior and shorter posterior flaps for supracondyloid osteoplastic operation. Long anterior and short posterior flaps for thigh throughout, where the tissue is limited. Oblique Circular, or elliptical, method for lower third.—(From Bickham's *Operative Surgery.*)

4. The case is one of either pyelitis, pyelonephritis or beginning cholecystitis or stone in the kidney. In the case of the two latter the paroxysms of pain will increase an intensity, and in the case of cholecystitis the pain will radiate to the shoulder whereas in stone in the kidney it will radiate down the course of the ureter. Urinary examination and catheterization of the ureters will show if it is pyelitis or pyelonephritis.

5. The *indications for enucleation of the eye* are: "(1) Injuries of the ciliary region when the eye is completely blind, or the traumatism so extensive that the form of the eyeball cannot be preserved; (2) traumatic iridocyclitis, to prevent or cure sympathetic ophthal-

mia; severe pain in a blind eye; (4) iridocyclitis, phthisis bulbi, and glaucoma, when accompanied by severe pain or inflammatory symptoms, and when the eye is blind or is certain to become so; (5) malignant tumors, either intraocular or epiocular, if they cannot be removed with retention of the eyeball; (6) anterior staphyloma, if the eye is blind, troublesome, and disfiguring; (7) panophthalmitis, after the suppurative stage is passed; (8) foreign bodies in the eye when they cannot be removed and cause irritation, or the eye is blind."

Enucleation of the eyeball is performed as follows: "A general anesthetic is generally given. After introduction of the speculum, the conjunctiva is divided all around the cornea, as close to its border as possible, and dissected back as far as the insertions of the recti muscles. A squint hook is passed beneath the tendon of the internal rectus, and the latter is divided with the strabismus scissors close to its insertion; then the other straight muscles are cut in the same way, together with the subconjunctival connective tissue for some distance beyond the equator. The points of the scissors must always be directed toward the eyeball and the latter stripped as clean as possible to avoid any unnecessary removal of orbital tissue. Instead of commencing with a circumcorneal division of the conjunctiva, we may begin with a tenotomy of the internal rectus and then divide the conjunctiva as we pass from tendon to tendon. The hook is passed around the globe to make sure that the attachments of the muscles have been completely divided. The eyeball is then dislocated forward by pressing the speculum backward, and thus the optic nerve is put on the stretch. A pair of enucleation scissors, closed, are passed between sclera and conjunctiva, feeling for the optic nerve; they are withdrawn, slightly opened, and the nerve is divided close to the sclera. The eyeball is held between the thumb and index finger of the left hand, and the oblique muscles and other unsevered attachments are divided. The orbit is plugged for a few minutes to control hemorrhage, and the conjunctiva is usually closed with a single suture, which is passed through its edge at intervals and tied like the string of a pouch. The eye is bandaged and the patient kept in bed for a day." (May, *Diseases of the Eye.*)

6. *Ether anesthesia:* "During the *first stage* of anesthesia, which ends with the loss of consciousness, the pulse is accelerated, the pupils large and mobile, and a rather pleasant feeling of drowsiness, and

tingling in the extremities, is experienced. Many patients breathe deeply, others hold their breath; in the latter instance all that need be done is to remove the cone for a moment. Cough is rarely annoying if the drop method be employed. With the onset of unconsciousness there is a short period of analgesia (primary anasthesia), during which brief operations may be performed. The *second stage*, or the stage of excitement, extends from the loss of consciousness to the loss of reflexes. Memory, volition, and intelligence are abolished, while laughing, shouting, and struggling may occur. Slight movements of the extremities should not be restrained unless they interfere with the anesthetist, as such often evokes greater struggling. The pulse is rapid, the pupils are dilated and react to light, and the muscles may be rigid or thrown into clonic contractions. At this time the breathing may be irregular or temporarily suspended. The face is congested, sometimes cyanotic, and often covered with perspiration. More or less frothy mucus is present in the mouth and throat, and sometimes it becomes excessive. During the *third stage* the breathing is deep and audible, the pulse full and regular, the muscles relaxed, and the corneal reflex abolished. Touching the cornea with the finger, however, may produce irritation, and it is much better simply to separate the lids and notice the presence or absence of flaccidity. The pupils are of moderate size and react to light. Dilated pupils failing to react to light indicate a dangerous degree of anesthesia. During this stage a transient roseolous rash may be noticed.

Chloroform anesthesia: "The phenomena of chloroform anesthesia are in the main similar to those of ether. The *first* and *second stages* are shorter, the vapor is more pleasant, and being less irritating than ether, not so much mucus is poured out. An excess of chloroform causes the patient to hold his breath, and if the inhaler is not withdrawn at this time, the patient may take a deep inspiration and get an overdose. This accident has resulted in death, and should be recalled when chloroforming crying children, and when a surgeon attempts to operate before the third stage is reached, thus causing the patient to breathe deeply. During the stage of muscular excitement, which is less marked than with ether, the respirations should be watched with great care. Chloroform vapor is not inflammable, but in the presence of a naked flame gives off irritating products (phosgene and hydrochloric acid), which, in a small room, may cause

irritation of the eyes and respiratory passages. The *third stage* is characterized by quiet respirations which are often difficult to appreciate. The pulse is sluggish and feeble in contrast to the full and rapid pulse of ether. The pupil is moderately contracted unless the anesthesia is profound, when it dilates. As with ether, dilated pupils, failing to react to light, indicate a dangerous degree of anesthesia." (Stewart's *Manual of Surgery.*)

7. The *treatment of central necrosis* comprises free incisions for drainage, antiseptic dressing, frequent cleansing, rest, nourishing food, stimulants, and tonics. When the sequestrum becomes loose the operation of sequestrectomy or necrotomy is performed, the extremity is drained of blood, an Esmarch band is applied, the bone is exposed by a longitudinal incision, the periosteum is reflected on each side, and the involucrum is broken through and the opening is enlarged with the chisel, gouge, and rongeur. The dead bone should be removed by sequestrum forceps, the cavity scraped by a sharp spoon, the lateral edges of the involucrum cut down until the cavity which formerly contained the sequestrum is very shallow, the wound is irrigated with hot salt solution, dried, painted with pure carbolic acid and then with alcohol, again irrigated with salt solution and firmly packed with iodoform gauze. Remove the Esmarch band, tie the vessels in the soft parts, suture the wound, and apply dressings. The simple removal of a sequestrum *i.e.*, the operation of sequestrectomy, often fails to effect a cure, and even in the most satisfactory cases healing requires a very long time. . . . If the periosteum is found not to be infected, it may be stitched together at the gap where the bone has been removed, so that a periosteal cord exists between the two ends of the bone; and the soft parts above this may be closed. . . . The cavity that is left by the removal of a sequestrum and the chiseling of the walls of the involucrum, if large, may be filled by various methods more or less satisfactory. In some cases of widespread necrosis, due to diffuse infective osteoperiostitis, or to osteomyelitis, extensive resection or even amputation, may be necessary." (DaCosta's *Surgery.*)

8. A right rectus incision gives access to the gall bladder and ducts, duodenum, ascending colon, right kidney, ureter, liver, appendix, stomach. A vertical incision is made in the skin and fascia, about three inches long, and calculated to fall about three quarters of an inch internal to the outer border of the

rectus; clamp vessels; retract overlying tissues, and expose the rectal sheath. Incise the anterior sheath of the rectus. Retract outwards the outer portion of the divided sheath of the rectus, so as to expose the outer border of the rectus muscle, and then retract the intact rectus muscle inward. Incise the posterior layer of the rectal sheath somewhat nearer the median line than in the case of the anterior layer. Or, in operating in the neighborhood of the deep epigastric artery, in order to avoid this vessel, the incision in the posterior layer may be made somewhat further outward than the incision through the anterior layer. The artery may, however, be readily ligated if in the way. In the same line as the division of the posterior layer of the rectal sheath, incise vertically the subjacent tissues which will consist of transversalis fascia, subperitoneal areolar tissue, and peritoneum, except below the similunar fold of Douglas, below which line the posterior layer of the sheath itself consists of transversalis fascia alone, and the subjacent tissues consist of subperitoneal areolar tisue and peritoneum. Having accomplished the object of the operation, the structures are to be sutured in the following layers—peritoneum, subserous areolar tissue, and posterior layer of the rectal sheath, with interrupted or continuous catgut suture; —anterior layer of rectal sheath with interrupted gut sutures, which also pass partly through the rectus muscle (the displaced border of the rectus should also be sutured to the outer margin of the rectal sheath);—the fascia, with gut—and the skin with subcuticular silk, or interrupted silkworm gut sutures (or skin and fascia may be sutured together). (Bickham's *Operative Surgery.*)

9. The varieties of hemorrhoids are external, internal and mixed. *The application of a ligature* is the operation most often performed. The patient is placed in the Sims position, and after the field of operation has been rendered aseptic, the sphincter is divided. The rectum is irrigated with a mercuric chloride solution, 1:5,000. A needle carrying a ligature is passed through the base of the tumor. The thread is cut and the ligature is firmly tied on each side. At least two-thirds of the pile should be excised by the scissors. Iodoform gauze is inserted, and a T-bandage is applied. Morphine (gr. ¼) is then given. The bowels should be moved on the third day. (*Pocket Cyclopedia.*)

Clamp and cautery. Radical treatment is advisable when there is much pain and bleeding. It must be ascertained first that the piles are not due to disease

elsewhere, as cirrhosis or stricture, or to pregnancy. The bowels are emptied and the patient is placed in the lithotomy position. The sphincter is then dilated with two thumbs, to expose the piles, which are caught up with ring forceps. A clamp is applied to the piles in turn, and they are removed by the cautery. The bowels are kept confined for five or six days, when castor oil is given. Very little pain and no bleeding follow this operation. Removal can be done by snipping the mucous membrane around the pile and ligaturing its base. Crushing is also done. (*Aids to Surgery.*)

10. In the case of very old persons the impacted fracture should be left impacted; the unimpacted fractures should be reduced; both fractures should be retained in position by a splint; but it is unadvisable to keep the patient for any length of time on his back. The dangers to old people are hypostatic pneumonia and the formation of bed sores; in the case of the impacted fracture the fixation should not be as thorough as is practised in young people, and massage may also be employed. Ambulant treatment should be instituted as early as possible.

PEDIATRICS.

1. *Flatulent colic* comes on rather suddenly; the child cries, and has a distended abdomen; the thighs are flexed on the abdomen, and the extremities may be cold. The treatment consists of hot applications to the abdomen, hot rectal and colonic irrigations with saline solution; the abdomen may be massaged with warm olive oil; a mixture containing chloral hydrate, sodium bicarbonate and peppermint water may be of service. It is frequently due to an excess of sugar in the food.

2. *Otilis media* generally occurs during one of the exanthematous diseases, or following diphtheria, tonsillitis or typhoid; it is due to a streptococcus. It may lead to perforation of the drum membrane, sinus thrombosis, or meningitis. The treatment consists of hot irrigations with saline solution, and early incision of drum membrane.

3. *Diphtheria* may simulate follicular tonsillitis and non-diphtheritic laryngitis or croup. In both cases a smear taken, and followed by proper culture and bacteriological examination will show absence of the Klebs-Loeffler bacillus. Further, the follicular tonsillitis is accompanied by a high fever (diphtheria is not); and in diphtheria the membrane is adherent to the underlying tissues, is removed with difficulty,

bleeds when removed, and reforms; whereas in other similar conditions the membrane is easily removed, does not bleed, and does not form again.

4. In *pertussis* the incubation period is from 4 to 14 days, and is followed by a stage in which catarrhal symptoms, loss of appetite, fever, and restlessness are present. The paroxysms begin about the second week and consist of a number of short, spasmodic, expiratory coughs, succeeded by a long-drawn inspiration and a peculiar whoop, often terminating in vomiting. The eyes are suffused and the under lids are swollen and pinkish in color. The number of paroxysms may be very great, and this stage lasts from 3 to 4 weeks or longer. The symptoms then gradually ameliorate, and the stage of decline lasts 2 or 3 weeks longer. Convulsions, vomiting, bronchitis, and bronchopneumonia are the chief complications.

5. *Acute poliomyelitis* is a disease peculiar to childhood, and characterized by sudden paralysis of one or more limbs or of individual muscle-groups, and followed by rapid wasting of the affected parts, with reaction of degeneration and deformity. The onset is sudden and marked by fever, vomiting, convulsions, or even coma. Paralysis and atrophy of the muscles, with reactions of degeneration, then present themselves. It occurs usually during the first three years of life and most often during the summer months. It sometimes occurs in epidemics.

The treatment during the initial stage consists in rest in bed, restricted diet, fractional doses of calomel, and sponging, or small doses of phenacetin if the fever and nervous symptoms are marked. An ice-bag should be placed along the spine, or mild counterirritation to the spine by mustard plasters may be practised. After the acute symptoms have subsided, electricity and passive movements may be employed. Deformities may result and will require the application of mechanic apparatus or the performance of surgical operations for their correction. (*Pocket Cyclopedia.*)

URANALYSIS MICROSCOPY, TOXICOLOGY, AND MEDICAL JURISPRUDENCE.

1. *Urates* cause a pinkish deposit, dissolve when the urine is warmed, and are generally amorphous.

Both *phosphates* and *albumin* are precipitated if the urine is boiled; on the addition of a few drops of acetic acid the phosphates dissolve, but the albumin does not.

2. *Drugs that render the urine alkaline:* Potassium and lithium salts; they are given in cases of gout,

lithemia, when diuretics are needed, in cases of strongly acid urine. They are given largely diluted with water. To *acidify alkaline urine*, one may use vegetable acids, benzoic acid, and salicylic acid.

3. CASTS. *Epithelial*, are found in desquamative nephritis. *Blood*, are found in acute renal hyperemia, acute nephritis, renal hematuria, and hemorrhagic infarction. *Pus*, in suppurative nephritis. *Bacterial*, in pyelonephritis, and suppurative nephritis. *Granular*, in chronic or degenerative nephritic processes. *Fatty*, in large white kidney, subacute or chronic nephritis with fatty degeneration. *Hyaline*, in all inflammatory conditions of the kidneys, also in circulatory disturbances (without organic change) of the kidneys. *Waxy*, in chronic nephritis.

4. *Hematuria* is the presence of blood in the urine when voided. It may be caused by: Infectious diseases, scurvy, purpura, pernicious anemia, congestion of the kidneys, traumatism or inflammation in any part of the urinary tract. On miscroscopical examination red blood corpuscles can be distinguished.

5. *The effects of poisonous drugs may be modified by:* Race, age, sex, weight, condition of health, and idiosyncrasy or tolerance.

6. In *lead poisoning*, magnesium sulphate is given: this converts the lead into the insoluble lead sulphate. Potassium iodide is also given, to aid in the elimination of such lead as is absorbed.

7. "In order to raise a valid inference in the mind of a medical attendant that poison has been administered to a patient, certain facts must be brought under his notice; and without the concurrence of at least two or more of these, the actuality of poisoning cannot be maintained. The sources of evidence in cases of suspected poisoning are the *symptoms;* the *post-mortem appearances; chemical analysis* of articles of food or drink, or of the body and the excretions; and *experiments upon animals.* The evidence derived from these sources, being compared with the known properties and effects of various poisons in authenticated cases, will enable the physician to form a correct opinion as to the probable administration or not of a poison. It is rarely that the symptoms exhibited during life do not afford some clue to the cause of illness; and most frequently the symptoms are all that the medical attendant has to guide him to a diagnosis of the nature of the case, during the lifetime of the patient. Sometimes, however, persons are found dead as the result of poison, concerning the manner of whose death nothing

whatever can be learned; a suspicion of poisoning arising from the circumstances under which the corpse is found. Here the aid of chemical analysis ought invariably to be invoked; and fortunately in these cases the delay involved in making an analysis is of comparatively little moment. . . . The general conditions which should excite a suspicion of poisoning are the sudden onset of serious and increasingly alarming symptoms in a person previously in good health, especially if a prominent symptom be epigastric pain; or where there is complete prostration of the vital powers, a cadaverous expression of the countenance, an abundant perspiration, and speedy death. In all such cases the aid of the chemist is required, either to confirm well-founded, or to rebut ill-founded suspicions." (Quain's *Dictionary of Medicine.*)

8. If the vomited matters are agitated in the dark they are luminous.

9. "As natural abortion usually occurs at about the third or fourth month of pregnancy, and as this period is also the one at which a criminal operation is performed, the fact that the fetus comes away entire would indicate that abortion was due to natural causes, or at least not to instrumental violence. If, however, the fetus be expelled first and the ruptured membranes afterward, the conclusion would be that instruments had been used.

"If death follows within three days after abortion, the post-mortem examination will generally establish the fact that an abortion was committed. If several weeks, however, have elapsed, little or nothing will be learned by the autopsy, as the parts involved will have usually reassumed by that time their usual condition." (Chapman's *Medical Jurisprudence.*)

10. *Phenomena and signs of death*, are: The complete and permanent cessation of circulation and respiration, rigor mortis, loss of body heat, pallor of the body, putrefaction.

HYGIENE.

1. "The principal methods of heating houses and rooms are: 1. Open fires. 2. Stoves. 3. Furnaces. 4. Hot-water pipes. 5. Steam pipes. The method most applicable in any particular case will depend upon the size of the room and the number of rooms in the building. In general, it may be stated that the smaller the space, the more simple the method. For a single room, an open fire or a stove will be sufficient; for a small

house, stoves or a furnace; for a large one, one or more furnaces or hot-water or steam apparatus; and for large buildings—office buildings, for instance—'direct' or 'indirect' steam." (Harrington's *Hygiene.*)

2. *Principles of ventilation:* "(1) There must be a constant stream of pure air admitted into the room. (2) The inlets and outlets should be placed as far apart as possible, so as to allow of proper diffusion throughout the room. If possible they should be placed on opposite sides of the room with natural ventilation, but on the same side with artificial ventilation. (3) The inlets for cold air must discharge some five or six feet above the level of the floor, and the outlets for vitiated air must be near the ceiling. (4) The admission of warm air can be permitted near the floor. (5) The incoming air should be itself pure and of sufficient quantity. (6) The inlets for each person in the room must equal in total area 24 square inches, and the outlets should contain the same area. (7) The incoming air must not produce a draught. (8) The ventilation of a large room is always easier than that of a small one. (9) A large room will not compensate after the first hour for a proper system of ventilation. (10) If proper inlets and outlets are constructed, all other means for the admission of air should be closed. (11) The windows of all unoccupied rooms should be opened wide so that they may be flushed with a stream of pure air." (From Evans' *Student's Hygiene.*)

3. *Water supply* from: (1) *Rain water* collected immediately as it falls as rain, dew, snow, etc. (2) *Surface water* collected in ponds, lakes, streams, etc., and in free contact with air. (3) *Ground water, or sub-soil water,* derived from the rain water of the district, but which percolates through the subsoil, and so is not directly exposed to the atmosphere. (4) *Deep or artesian water,* which is separated from the ground water by one or more impermeable layers.

4. *Diseases specially liable to be conveyed by the ingestion of milk:* Tuberculosis, typhoid fever, scarlet fever, diphtheria, tonsillitis, cholera, and gastrointestinal disorders.

The milk may come from a diseased cow; it may become contaminated by the milker, the container, the surroundings, the water used to wash the cans or to adulterate the milk; or it may become contaminated at the dealer's or purchaser's house by being left uncovered, exposed to flies, etc., or by not being kept in a cool place. The only way to prevent the transmission of disease by milk is to insist on a thorough inspection

of all dairies and sources of milk supply, and to educate the public in the care of milk between the time of its purchase and its consumption. The inspection should include: the color, reaction, specific gravity, sediment, taste, odor, acidity, total quantity of solids and of water; the percentage of cream, fats, lactose, casein, and ash; the presence or absence of preservatives, coloring matter, added solids, dilution, pathogenic microorganism, dirt, or other foreign matter. There should also be thorough investigation as to its source, the cows and their environment, the method employed in caring for, milking, storing, and transporting the milk.

5. *Diseases transmitted by mosquitoes:* Malaria, yellow fever, dengue, and filariasis.

6. The mosquito which transmits malaria is the *Anopheles.* Its wings are usually spotted; in the resting posture, the axis of the head, proboscis and body are in the same straight line; its body is of a dark gray or brown color; the female alone bites and transmits the *Plasmodium malariæ;* the larvæ float on the surface of water.

"The most efficient way of getting rid of mosquitoes is to make it impossible for them to breed. The eggs of a mosquito are laid in water, and water is absolutely necessary for the larval and pupal stages, which must be passed through before the adult mosquito is produced. Fish destroy developing mosquitoes and large sheets of water are too rough for them; so mosquitoes must have, for breeding, rather small collections of fresh water free from fish. Mosquitoes will soon disappear from a locality if all such collections of water, within a quarter of a mile of it, are filled up, drained, or covered with a film of coal oil so as to make it impossible for the mosquitoes to breed in them. Those who live in a malarious district should protect themselves from mosquito bites by the careful use of mosquito netting. By the simple observance of these evident indications, malaria has already been banished from several localities in which it was formerly endemic." (Marshall's *Microbiology.*)

7. *Disinfection of Rooms:* "Practical disinfection is a process which needs scientific precision and attention to details. The disinfection must be adjusted to the form and nature of infection and the infected materials and objects, each of which may need a different method of handling and disinfection. The room air needs no disinfection, for whatever germs may be found in dust of the air in a room will settle upon the

surfaces whenever the room is closed and left undisturbed. The room walls if covered with paper may be efficiently disinfected by thorough rubbing with stale bread. Painted surfaces of walls and ceilings may be disinfected by washing with 3 per cent. solution of carbolic acid or a 1 to 500 solution of sublimate of mercury. Floors and other surfaces of rooms may also be conveniently scrubbed with hot water and a solution of carbolic acid or sublimate, or one of the cresols. Carpets, rugs, etc., may be efficiently disinfected by a strong solution of formalin, by gaseous disinfection with formaldehyde, or may be taken up and subjected to superheated steam under pressure. Curtains, hangings, etc., within the rooms are disinfected with formaldehyde, and may also be washed in boiling water. Wooden bedsteads may be washed with a 3 per cent. carbolic solution or a 5 per cent. formalin solution. Bedding, linen, etc., may be disinfected by steam, by formalin, and also by formaldehyde. For the successful disinfection of rooms with a gas it is necessary to close all openings, cracks and crevices, keyholes, etc., completely, and especially the crevices about windows and doors. This is done by means of cotton, or, better, by means of gummed paper strips. Raising the temperature of the room assists disinfection. The room is then closed and all openings and crevices sealed with gummed paper, and the room is left for at least twenty-four hours." (Price's *Hygiene and Public Health.*)

Sulphur and formaldehyde are the two commonest agents used to disinfect rooms.

"*Municipal quarantine* comprehends measures for isolating those sick with certain of the infectious diseases, such as scarlet fever, diphtheria, and smallpox, keeping others under observation, and disinfecting rooms and houses and objects contained therein which may be capable of harboring infection. It is beyond dispute that public safety requires that certain sick should be shut off from free communication with the outside world. The isolation is most complete and entails less hardship when it can be carried out at a special hospital for contagious diseases, but generally it is enforced, if at all, at the patient's home. Room and house quarantines are commonly difficult or impossible of enforcement, especially in tenement districts among the very poor, for it is among this class that danger of infection is least understood and mutual help and neighborly visiting most extensively practised, and thus the foci of infection may become increased

indefinitely. In hospitals, on the other hand, where indiscriminate egress and ingress are under control and facilities for the disinfection of discharges are at hand, the danger of spread is reduced to a minimum. Especially difficult and productive of hardship is the isolation not only of the patient, but also of the other members of his family. This is commonly practised in the case of smallpox, but is unnecessary if the other members have undergone recent successful vaccination, and their clothing and other effects are disinfected and they are then separated from all possible contact and communication with the patient. But even then, they should be kept under surveillance for a time equal to the period of incubation. In times of epidemics of yellow fever in the South, house quarantine of entire families has proved to be the cause of much hardship and anything but an unqualified success. It causes great popular dissatisfaction, leads to concealment of cases, and tends, therefore, to spread rather than restrict the disease. Treatment of the sick in isolation hospitals and removal of those who have been exposed to infection to camps of detention for five full days have been found to give far better results. In some outbreaks of infectious diseases, it is necessary or advisable to conduct a house to house inspection for the discovery and isolation of unreported cases. When such a course is undertaken, the visits should be repeated at intervals equal to the period of incubation. The making of regulations for municipal quarantine and inspection is subject to no general rule, each local authority being a law unto itself. In some cities, the rules governing notification, isolation, and disinfection are exceedingly thorough and strictly enforced; in others, they are inadequate in varying degrees and enforced with laxity." (Harrington's *Hygiene*.)

8. In addition to many of the diseases which are found in temperate climates, people in the tropics are liable to: Ancylostomiasis, beriberi, cholera, blackwater fever, dengue, dysentery, filariasis, leprosy, malaria, Malta fever, pellagra, plague, tick fever, trypanosomiasis, yaws.

9. To prevent disease among the troops, the surgeon should see that, as far as possible, the soldiers have pure air, pure water, and good, suitable and digestible food; that personal cleanliness is the rule; that dissipation and excesses are avoided; that protective inoculation is practised where possible; that the soldiers are instructed as to the dangers of venereal diseases; that frequent and thorough inspections are made, and

that those who have any infections or communicable disease are isolated. Powers of endurance should be increased by suitable exercises; and undue fatigue and idleness must be prevented.

10. Those suffering from cerebrospinal meningitis should be quarantined till recovery; all bodily discharges, especially those from the nose and throat must be disinfected. "Carriers" must be sought for, as in diphtheria; and if found must be isolated. The public must be instructed as to the nature and seriousness of the disease.

BACTERIOLOGY AND PATHOLOGY.

1. Bacteria multiply by division or fission, and also (indirectly) by spore formation. Cocci may divide in one, two, or three directions of space. Bacilli divide transversely to their long axis. Spirilla divide transversely to their long diameter. A bacterium about to divide seems to be larger than normal, and if it is a coccus it becomes more ovoid; changes occur first in the nucleus, and the bacterium thus simply falls in two.

It has been calculated that a single bacterium could, by fission, produce two in one hour. Fortunately they seldom obtain food enough to keep up this process for any length of time.

Aerobic bacteria are such as cannot ordinarily live and grow without air or oxygen. *Anaerobic bacteria* can usually live and grow only in the absence of air or oxygen.

2. *Staining peculiarities of the tubercle bacillus.* It does not stain readily with the usual anilin dyes, but take the stain only when the staining solution is heated, or the exposure unduly prolonged. When once the stain is taken it is held tenaciously and even resists the action of acids. Hence it is said to be "acid-fast," and this property is made use of in staining sputum or other material for the tubercle bacilli, when other bacteria are counterstained after having the first stain removed by acid. It is Gram-positive.

3. The *diplococcus intracellularis meningitidis* is a non-motile, non-flagellated coccus, does not form spores, is aerobic and optionally anaerobic, pathogenic, stains by ordinary methods, is Gram-negative; it is a biscuit-shaped diplococcus somewhat resembling the gonococcus. It can be grown on blood-serum and on glycerin agar.

4. A THROMBUS is a blood clot formed in the blood vessels during life. The process of formation of a thrombus is called thrombosis.

Causes: Changes in the blood current; changes in the vessel wall; anything within the blood current not covered with endothelium. Generally more than one of these conditions are present.

Results: Among the consequences of thrombosis may be mentioned the formation of emboli; infarction; heart clot, and sudden death; cerebral softening; the thrombi may become organized, liquefy, soften, become calcified, putrefy, become discolored, or they may undergo revolution.

5.

	SARCOMA	CARCINOMA
1. *Origin.*	Entirely mesoblastic (connective tissue type).	Epiblastic and hypoblastic. (Epithelial tissue type.)
2. *Stroma.*	Intercellular. Rarely forms alveoli.	Vascular connective tissue, which surrounds and forms the walls of the alveoli; these communicate with one another, and contain masses of epithelial cells.
3. *Cells.*	Granulation tissue or embryonic connective tissue cells; shape and size vary.	Epithelial cells contained within alveoli; shape and size vary.
4. *Intercellular substance.*	May be present.	Absent, or merely fluid.
5. *Vessels*	Embryonic in character. They are in direct contact with, or may be formed by, the special cells, slightly modified, of which the tumor is composed.	Well developed; entirely contained within the connective tissue stroma, and supported by the walls of the alveoli. Seldom in contact with the cells.
6. *Spreads.*	Primarily and secondarily by blood vessels, rarely by the lymphatics.	Primarily by lymphatics, except in the later stages, when it may also spread by blood vessels, in which case it spreads with very great rapidity. Secondarily by blood vessels.

(*Cyclopedia of Medicine and Surgery*)

TENNESSEE.

STATE BOARD EXAMINATION QUESTIONS.

TENNESSEE STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Give the formation of brachial plexus and the principal branches of same.
2. Name the branches of the femoral artery and give its anatomical relations in Scarpa's triangle.
3. Describe the shoulder joint and give its blood and nerve supply.
4. What is origin, point of escape, and distribution of the seventh cranial nerve.
5. Describe the temporal bone and give its articulations.
6. Name the superficial and deep groups of the flexor muscles of the forearm.
7. Give the boundaries of the inguinal canal.
8. Describe the colon.

PHYSIOLOGY.

1. Give relations of chemical changes in muscular contraction to fatigue and give the chemical theory of fatigue.
2. Give briefly the theories of muscular contraction.
3. Give the neuron doctrine.
4. Give the general properties of the blood and its histological structure.
5. Give the neurogenic and myogenic theories of the heart-beat and describe the automaticity of the heart.
6. Define dyspnea, giving its physiological causes; hyperpnea, and apnea, giving their physiological causes.
7. Describe dichromatic vision and give the tests for it, also describe achromatic vision.
8. Briefly define diffusion, dialysis, and osmosis and describe osmotic pressure.

MATERIA MEDICA.

1. Give antidotes for arsenic, carbolic acid, strychnine, and chloral hydrate.
2. Describe the physiological action and give the therapeutic use of digitalis.
3. Differentiate between apoplexy and opium poisoning.
4. What is ergot? What are its most pronounced physiological actions?
5. Give indications for the use of the following: nux vomica; arsenic; belladonna.
6. What is mercury? Source; physical properties; uses; dosage? Remarks.

7. Give five drugs and their incompatibles.
8. Name two acids, two alkalies, and two mineral poisons. Symptoms, cause of death in, and their antidotes.

CHEMISTRY.

1. Define the following: allotropism; endosmosis; alloy; amalgam.
2. Select the five most important reagents for a uranalysis outfit, and state why you select each.
3. What is the explanation of souring and curdling of milk? How is soured milk supposed to prolong life?
4. What are ptomaines? Name some of the best known ptomaines.
5. Give the chemical names and formulas of the following: sugar of lead; flowers of sulphur; blue vitriol; white lead; red lead; baking soda; quick lime; lime water; lime stone; blue stone.
6. Point out the analogy between marsh-gas (paraffin) and the benzine series of hydrocarbons. Name two prominent members of each group.
7. Describe a test for (*a*) albumin, (*b*) sugar, (*c*) pus, (*d*) indican, (*e*) chyle.
8. How would you test milk for impurities? For adulterants?

PATHOLOGY.

1. Explain why and how obstructive disease of the coronary arteries causes myocardial degeneration.
2. What is the pathology of acute appendicitis, going on to suppuration?
3. Discuss primary, concurrent (or mixed), and terminal infections.
4. Give the pathology of acute anterior poliomyelitis.
5. In the case of a woman, who a few days after childbirth, is suddenly taken with dyspnea and cardiac syncope and quickly dies, describe the pathological conditions you would expect to find post-mortem.
6. Describe the appearance of the heart in an advanced case of mitral stenosis. What are the results of mitral stenosis on other organs? Explain how these results are brought about.
7. What part of the spine is affected in Pott's disease? Describe the pathological changes taking place in the bone in Pott's disease.
8. What is an "autogenous vaccine?" On what principle or principles is vaccine therapy based?

PRACTICE.

1. What conditions are accompanied by severe pain

in the chest, and what characteristic symptoms would enable you to differentiate them?

2. In a case of uremia, indicate the various conditions that must be considered; state the appropriate remedies for each condition and give definite reasons for the use of each remedy.

3. Describe briefly the following diagnostic signs or tests and name opposite each, the disease or diseases in which they may be found: Koplik's spots; Romberg's symptoms; Argyll-Robertson pupil; Babinski's reflex; Kernig's sign; Stokes-Adams syndrome.

4. (*a*) Name the cardinal symptoms of tumor of the brain. (*b*) What is the diagnostic value of pulsating jugulars.

5. Differentiate cardiac hypertrophy and dilatation.

6. Give the cause, symptoms, and treatment of cerebrospinal meningitis; the symptoms of tuberculous meningitis.

7. Name the causes of displaced apex-beat and state the physical signs of one of the conditions mentioned.

8. (*a*) Diagnose and treat herpes zoster. (*b*) What causes a large per cent. of all cases of early blindness? Give preventive treatment.

OBSTETRICS.

1. Give (*a*) bones, (*b*) divisions, (*c*) straits, and (*d*) symphyses of the obstetric pelvis. In what way does it differ from the male pelvis?

2. Name the internal female organs of generation. Describe the uterus fully, and give its relations to the other organs in the pelvis.

3. What is menstruation? How soon would a woman menstruate after parturition?

4. Describe the pregnant uterus, and state how it differs from a normal uterus. How early can you diagnose pregnancy? Give the signs by which you would do it.

5. Give a differential diagnosis between a supposed six months' pregnancy and an ovarian tumor; a uterine fibroid; ascites; a gaseous accumulation.

6. Give the proper management of the breasts before and after labor.

7. Give all the means or drugs that you know to facilitate a tedious and painful labor.

8. What precautions would you take in obstetric work in case of a doctor or nurse who had been in attendance on a septic case?

SURGERY.

1. Give the symptoms, complications, and treatment of fracture of ribs.

2. Define toxemia, septicemia, pyemia, sapremia.
3. Give the causes, symptoms, and treatment of suppurative mastoiditis.
4. Give symptoms of simple, compound, and compound comminuted fracture of tibia and fibula and treatment of each condition.
5. What articular changes take place in dislocations? What are the general principles governing the treatment of dislocations?
6. Differentiate benign and malignant tumors. Name two of each.
7. Give symptoms, diagnosis, and treatment of tuberculous kidney.
8. Give the etiology, symptoms, and varieties of erysipelas.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

TENNESSEE STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *brachial plexus* is formed by the union and subsequent division of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves. The union of the fifth and sixth makes the upper trunk; the seventh forms the middle trunk, and the eighth cervical and first dorsal make the lower trunk. Each of these trunks is divided into an anterior and a posterior branch. The anterior branches, from the upper and middle trunks, make the upper or outer cord of the plexus; the anterior branch of the lower trunk becomes the lower or inner cord; the three posterior branches unite to form the posterior or middle cord. The plexus lies between the Scalenus anticus and medius. The *branches* are: (1) Above the clavicle; communicating, muscular, posterior thoracic, and suprascapular. (2) *From outer cord:* External anterior thoracic, musculocutaneous, and outer head of median. (3) *From inner cord:* Internal anterior thoracic, lesser internal cutaneous, ulnar, and inner head of median. (4) *From posterior cord:* Subscapular, circumflex, and musculospiral.

2. The *branches of the femoral artery*, are: Superficial epigastric, superficial circumflex iliac, superficial external pudic, deep external pudic, muscular, anastomotica magna, and profunda femoris (with branches: external circumflex, internal circumflex, and three perforating). The artery passes from the base to the apex

of Scarpa's triangle, it has the femoral vein on its inner side, and the anterior crural nerve on its outer side; it is covered by the skin and superficial fascia.

3. The *shoulder-joint* is an enarthrodial joint formed above by the glenoid cavity of the scapula and below by the head of the humerus. Its ligaments are glenoid, coraco-humeral, and capsular. The glenoid surrounds the edge, deepens the glenoid cavity, and is continuous above with the long head of the biceps tendon. The capsular ligament, extensive and loose, arises above it from circumference of glenoid cavity behind the ligament, is attached below to the anatomical neck of humerus, and is pierced by tendons of two or three muscles. The coraco-humeral, or accessory, is a fibrous band which extends obliquely downward and outward from the coracoid process to the anterior part of great tuberosity, strengthening the capsular ligament. A *synovial membrane* lines the joint, and forms the bursa under the subscapularis. It is reflected round the tendon of the biceps, and lines the bicipital groove. The *nerve supply* is from the circumflex and suprascapular nerves. The *arteries* are branches of the anterior and posterior circumflex, and the suprascapular.

4. The seventh cranial nerve has its superficial origin in the medulla oblongata, in the groove between the olivary and restiform bodies; it leaves the skull through the stylomastoid foramen; it is distributed to the muscles of expression of the face, the muscles of the external ear, the Platysma, Buccinator, Stylohyoid, and the posterior belly of the Digastric.

5. The *temporal bone* consists of three parts—the squamous, the mastoid and the petrous parts. The *squamous* portion is the anterior and upper part of the bone, and presents an external and internal surface, and a superior and inferior border; the chief points on it are the zygoma, temporal ridge, eminentia articularis and glenoid fossa. The *mastoid* portion consists of an outer and inner surface, and presents mastoid foramen, mastoid process, digastric fossa, sigmoid fossa, mastoid cells and mastoid antrum. The *petrous* portion presents an apex; superior, anterior, posterior and inferior surfaces, and three borders; on it are the canal of Huguier, internal auditory meatus, aqueduct of Fallopius, jugular fossa, stylomastoid foramen, carotid canal, and styloid process. It gives attachment to the following muscles: Temporal, masseter, occipitofrontalis, sternomastoid, splenius capitis, trachelomastoid, digastric, posterior, auricular, stylohyoid, stylopharyngeus, *styloglossus*, levator palati, tensor tympani,

tensor palati, and stapedius. It *articulates with:* Occipital, parietal, sphenoid, malar, and inferior maxillary bones.

6. FLEXOR MUSCLES OF FOREARM. *Superficial group:* Pronator radii teres, flexor carpi ulnaris, flexor carpi radialis, palmaris longus, and flexor sublimis digitorum. *Deep group:* Flexor profundus digitorum, flexor longus pollicis, and pronator quadratus.

7. BOUNDARIES OF THE INGUINAL CANAL. *In front:* the skin, superficial fascia, aponeurosis of the external oblique, and (for its outer third) the internal oblique. *Behind:* the conjoined tendon, the triangular fascia, the transversalis fascia, subperitoneal fat, and peritoneum. *Above:* the fibers of the internal oblique and transversalis. *Below:* Poupart's ligament and the transversalis fascia.

8. The colon is divided into ascending, transverse descending, iliac, and pelvic.

The *ascending colon* extends from the cecum to the under surface of the liver to the right of the gall-bladder, where it turns to the left, forming the *hepatic flexure.* It lies in the right iliac and right hypochrondriac regions. The peritoneum covers the anterior and lateral surfaces. Length, 8 inches. *Relations.—In front:* The convolutions of the ileum; *behind:* Iliacus, quadratus lumborum, outer side of right kidney.

The *transverse colon* passes from right to left, from the gall-bladder to the spleen. It forms an arch, convex anteriorly and below: the *transverse arch of the colon.* It is entirely surrounded by peritoneum, which is attached posteriorly to the spine, forming the mesocolon. Length, 20 inches. *Relations.—Above:* Liver, gall-bladder, large curvature of stomach, lower end of spleen; *below:* small intestines; *anteriorly:* anterior layers of great omentum, anterior abdominal wall; *posteriorly:* right kidney, second part of duodenum, transverse mesocolon, pancreas, and small intestines.

The *descending colon* passes from the end of the transverse colon by a bend, *the splenic flexure.* Between the splenic flexure and the diaphragm, opposite the tenth left rib, is a fold of the peritoneum, the *costocolic ligament,* which slings up the spleen. The gut then passes downward to the iliac crest, ending in the iliac colon. The peritoneum invests its anterior and lateral surfaces. Length, 4 to 6 inches. *Relations.—Behind:* left crus, left kidney, quadratus lumborum, and psoas; *in front:* small intestines; *inner side:* outer border of left kidney.

The *iliac colon* is continuous with the descending

colon at the left iliac crest, and ends at the inner border of the left psoas. Peritoneum invests its anterior and lateral surfaces; it has no mesentery. Length, 5 to 6 inches. *Relations.—In front:* Small intestines; when distended, the anterior abdominal wall; *behind:* left iliopsoas.

The *pelvic colon* extends from the inner border of the psoas to the level of the third sacral vertebra. Length, 16 or 17 inches; very variable. It has an extensive mesentery. *Relations.*—Passing over left brim of pelvis, it crosses the left external iliac vessels and left ureter, and passes to right margin of pelvis, resting on bladder in male and uterus in female; above lie coils of small intestine. It then turns back to midline on posterior wall of pelvis, and, forming a second bend, descends to end in the rectum.—(From *Aids to Anatomy.*)

PHYSIOLOGY

1. *Fatigue.* "If several successive stimuli are sent into a nerve of a nerve-muscle preparation, each succeeding one not taking effect, however, until the influence of the preceding one has passed off, after a time the contracting muscle becomes fatigued.....In fatigue thus produced, the structures present are the nerve, motor end organs, and the muscle; the nerve was excited by repeated single induction shocks. Fatigue in this case is due: (i) to the consumption of those substances, especially carbohydrates, which normally exist in muscle, and which are available for the supply of muscle energy, and (ii) to the accumulation of the waste product of contraction, such as CO_2 and sarcolactic acid. These seem to be the chief source of fatigue, for if the muscle is allowed to rest and is then washed with 0.9 per cent. NaCl solution which contains a little alkali, fatigue gradually passes off. Moreover, fatigue may be artificially produced in muscle by feeding it with a weak solution of sarco-lactic acid.....In conclusion, it may be stated that the chief seat of fatigue is in the nerve cells of the brain and spinal cord, but that it also occurs in the motor end organs; that, in ordinary circumstances, fatigue cannot be demonstrated as occurring either in medullated or in non-medullated nerves. The fatigue, which occurs in the muscular fibers themselves, is due to the using up of those substances present in the tissue which, when oxidized, give rise to heat and energy. As in normal circumstances these substances are readily replaced by means of the blood and the lymph, it may be concluded that, under normal conditions of nutrition, fa-

tigue does not occur in the muscle fibres themselves."—(Lyle's *Physiology.*)

2. The *modes of action of muscle.* "We know the probable structure of cross-striated muscle, substantially, so far, at least, as appearances go. We know that it consists of two sorts of substances, one (anisotropic) doubly refracting polarized light, the other (isotropic) refracting it singly. We know that when the contraction occurs in cross-striated muscle the latter kind of material changes its place somewhat, while the former kind does not do so. We are sure that the metabolism of all sorts of muscle is, in part, the oxidation of carbohydrates and of protein, sarcolactic acid being a way-product, and carbon dioxide and water among the end-products. The more active the contraction of the muscle the more oxygen it consumes and the more carbon dioxide is liberated from it. We know that, as often happens in protoplasm, the chemism of metabolism gives rise to at least three sorts of kinetic energy: movement, heat, and electricity, for these may be measured and variously studied. If we start out with the fact that it is chemism undoubtedly which liberates these energies, we have the basis of the chief various theories of muscle-action. To one (Engelmann) it seems clear enough that the chemism gives rise to heat, which, by causing imbibition of sarcoplasm, brings about the contraction. Another "school" (Pflüger, Bernstein, Verworn, Fick) supposes that the chemism directly, i. e., without the intervention of heat, alters the two differing substances in such a way that the isotropic one swells into the anisotropic. A recent group of thinkers (Müller, Loeb) supposes that electricity is involved in causing the contraction. To others (e. g., Weber), the chemism seems to alter the natural elasticity of the myoids or fibrils, making them shorten and then lengthen. Numerous other hypotheses still less probable have been published at various times."—(Dearborn's *Physiology.*) Other theories are the thermodynamic theory and the surface tension theory.

3. The *neurone doctrine* teaches that the nervous system is composed of neurones; these neurones consist of a nerve cell and various processes; the peripheral nerves are the long processes. The neurones connect with each other by contact only, and are not continuous. The axon of the neurones is in contact with the dendrites or cell body of another neurone. The nerve conduction in the dendrites is away from the nerve cell, that in the axons is towards the cell body.

4. The *physical properties of blood:* Fluid, somewhat

viscid, red; specific gravity, from 1055 to 1062; alkaline reaction; saltish taste; characteristic odor; variable temperature (average, about 100° F.).

The *constituents of the blood* are plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts). The *white corpuscles* consist of water and solids (proteid, leuconuclein, lecithin, histon, etc.).

The *red blood corpuscles* are biconcave discs, about 1-3200 of an inch in diameter; they are non-nucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the removal of the pressure. Their color is yellowish. They contain hemoglobin.

Their *function* is to carry oxygen from the lungs to the tissues.

The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their functions are (1) to serve as a protection to the body from the incursions of pathogenic microrganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

There are also *platelets*, which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. Their function is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about 200,000 to more than 500,000 in each cubic millimeter of blood.

Plasma conveys nutriment to the tissue; it holds in solution the carbon dioxide and water which it receives

from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

5. "The *neurogenic theory of heart beat* supposes that the internal stimulus to the heart beat arises within the nerve cells which are present at the venous end of the heart, and that the excitatory wave is conducted by nerves."

"The *myogenic theory* supposes that the heart muscle itself possesses the property of automatic rhythmicality, and that this property is most marked at the venous end of the heart, and at the sinu-auricular and auriculo-ventricular junctions. The contraction wave is generated at the venous end of the heart in the muscle, and, in virtue of the conductivity of cardiac muscle, spreads over the muscle tissue of the auricles, and thence over the ventricles. In other words, the contraction wave commences in muscle and is conducted by muscle. The muscular continuity of the auricles and ventricles is brought about by the auriculo-ventricular bundle of His."—(Lyle's *Physiology.*)

"*Automaticity.*—Inasmuch as the heart continues to contract in a perfectly rhythmic manner after removal from the body and apparently without the aid of an external stimulus, it is said that the heart-muscle is automatic or spontaneous in action. Strictly speaking, however, this is not the case, for the reason that all movement, that of the heart included, is the resultant of the action of natural causes though their true nature may be beyond the reach of present methods of investigation."—(Brubaker's *Physiology.*)

6. *Dyspnea* means difficult breathing, and denotes any increase in the force or rate of the respiratory movements.

Dyspnea may be caused by: Stimulation of sensory nerves, increase of carbon dioxide or diminution of oxygen in the blood.

Hyperpnea means exaggerated respiratory action.

Apnea means cessation of respiratory action; it is often used for the term asphyxiation. It is due to prolonged and rapid ventilation of the lung. Asphyxia is suffocation, due to depriving the lungs of oxygen. It is caused by preventing oxygen from reaching the lungs; by obstruction of the respiratory passages; by inhaling a gas without oxygen, or one which strongly tends to displace oxygen from the hemoglobin, as carbon monoxide; or by interfering with the change of gases which should take place between the air and the blood.

7. In the *dichromatic*, color vision is represented by two fundamental colors and their combinations with white or black; the *achromatic* are totally color blind, and only see the white-gray-black lines.

The most common form of *dichromatic vision* is red or red-green blindness.

Tests are made by means of Holmgren's skeins of wool. "A number of skeins of wool are used and three test colors are chosen, namely, (1) a pale pure green skein, which must not incline toward yellow green; (2) a medium purple (magenta) skein; and (3) a vivid red skein. The person under investigation is given skein 1 and is asked to select from the pile of assorted colored skeins those that have a similar color value. He is not to make an exact match, but to select those that appear to have the same color. Those who are red or green blind will see the test skein as a gray with some yellow or blue shade and will select, therefore, not only the green skeins, but the grays or grayish yellow and blue skeins. To ascertain whether the individual is red or green blind tests 2 and 3 may then be employed. With test 2, medium purple, the red blind will select, in addition to other purples, only blues or violets; the green blind will select as "confusion colors" only greens and grays. With test 3, red, the red blind will select as confusion colors greens, grays, or browns less luminous than the test color, while the green blind will select greens, grays, or browns or a greater brightness than the test."—(Howell's *Physiology.*)

8. "The term *diffusion* has long been applied to the regular mixing of the molecules of two gases when brought into contact in a confined space. More recently it has been applied to the mixing of the molecules of two solutions when brought into contact. If, however, the two solutions are separated by a membrane, permeable to the solutions, diffusion will still occur. To this form of diffusion the term *Osmosis* has been applied in the case of water, and *Dialysis* in the case of diffusible substances. All bodies can be divided into two groups, *crystalloids* and *colloids*. To the former group belong bodies having a crystalline form, which readily go into solution in water. All such bodies are diffusible (dialyzable), their power of dialysis, however, varying considerably. To the second group belong such bodies as have no crystalline form (amorphous). These are generally bodies with a large molecule, which form colloidal suspensions in water, and are only slightly or not at all diffusible. An exception to

this second group is hemoglobin, which has a very large molecule but is crystalline and is diffusible."—Kirkes' *Physiology.*)

"*Osmotic* pressure may be defined as the pressure exerted by the molecules of the substance in solution against an enclosing wall, in consequence of which there is an osmosis of the surrounding solvent towards it. The reason for this pressure lies in the fact that, when the molecules of a substance are separated a certain distance, as they are when in solution, they repulse one another as do the molecules of a gas and in their flight strike against the outer layer of the solvent. The pressure of the molecules of a substance in solution is therefore comparable to the pressure of the molecules of a gas. Three methods may be employed for measuring the force of the osmotic pressure of different substances, viz.: 1. Physical. 2. The determination of the freezing point. 3. By calculation."—(Brubaker's *Physiology.*)

MATERIA MEDICA

1. Antidote for *arsenic* is freshly prepared solution of ferric hydroxide; for *carbolic acid*, sodium sulphate, or alcohol; for *strychnine*, tannic acid; for *chloral hydrate*, solution of potassium hydroxide, or strychnine.

2. DIGITALIS. *Physiological action:* It is a gastrointestinal irritant, it slows the rate of the heart, prolongs diastole, increases the force of the heart, it contracts the blood-vessels, and causes a rise in blood pressure, it also acts as a diuretic.

Therapeutic use: Digitalis is indicated in diseases of the heart: (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in nonvalvular cardiac affections; (4) in irritable heart, due to nerve exhaustion. Digitalis is contraindicated in diseases of the heart: (1) in aortic lesions when uncombined with mitral lesions; (2) when the heart action is strong, and arterial tension high. Digitalis is also a diuretic; and it is also used in some forms of nephritis, exophthalmic goiter, pneumonia, chronic bronchitis, etc.

3.—

APOPLECTIC COMA.	OPIUM POISONING.
Deep coma; sudden onset. If any injury, only a scalp wound.	Can be aroused unless very deep.

APOPLECTIC COMA.	OPIUM POISONING.
Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Pupils contracted to pinpoint size.
Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse rapid, may be irregular.
Respiration slow and irregular.	Respiration very slow—may be 6 to 8 per minute.
Temperature higher on paralyzed side, but lower in rectum.	Normal or subnormal.
Urine contains trace of albumin, but may be same as in uremia.	Normal.
Hemiplegia with convulsions on one side.	No hemiplegia.

4. Ergot is the sclerotium of the *Claviceps purpurea*. It should be moderately dried, preserved in a close vessel, and a few drops of chloroform should be dropped upon it occasionally. It is not fit for use if more than a year old.

Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it is an emmenagogue.

5. *Indications for the use of nux vomica:* As a general tonic or bitter; in indigestion, cardiac depression, impaired peristalsis, pneumonia, phthisis, amenorrhea, dysmenorrhea, impotence, some forms of paralysis, chorea, epilepsy, neuralgia, alcoholism, and urinary incontinence.

Indications for the use of arsenic: In stomach disorders, bronchial and pulmonary affections, diabetes, diarrhea, anemia and chlorosis, chorea, malaria, and chronic skin diseases.

Indications for belladonna: To relieve pain, relax spasm, check sweating, as a mydriatic, to check griping of purgatives; in asthma, to check fevers, in heart disease, shock and collapse, acute coryza, urinary incontinence, chordee, low delirium of fevers, mania, alcoholism; as an antigalactagogue, spasmodic cough.

6. *Mercury* is an absorbable metal. Its action on the circulation: In small doses it has a tonic effect; in

larger doses it diminishes the number of red-blood cells, impoverishes the blood, and thus upsets the digestion, and disturbs the general nutrition of the body.

It is prepared from cinnabar by distilling it in a current of air. It is a bright metallic liquid, volatile, very heavy, insoluble in water, and readily unites with many metals to form amalgams.

Preparations and doses: Emplastrum hydrargyri; Hydrargyrum cum creta, dose, 4 grains; Massa hydrargyri, dose, 4 grains. Unguentum hydrargyri; Unguentum hydrargyri dilutum; Hydrargyri oxidum rubrum; Unguentum hydrargyri oxidi rubri; Hydrargyri oxidum flavum; Unguentum hydrargyri oxidi flavi; Oleatum hydrargyri; Hydrargyri chloridum corrosivum, dose 1/20 grain; Hydrargyri chloridum mite, dose (laxative), 2 grains; (alterative) 1 grain; Pilulæ cathartice compositæ, dose 2 pills; Hydrargyri iodidum rubrum, dose, 1/20 grain; Liquor arseni et hydrargyri iodidi, dose 1½ minims; Hydrargyri iodidum flavum, dose, 1/5 grain; Liquor hydrargyri nitratis; Unguentum hydrargyri nitratis; Hydrargyrum ammoniatum; Unguentum hydrargyri ammoniati.

Uses: "Mercurials (especially the bichloride) are extensively used for antiseptic purposes in surgery and midwifery. The acid solution of mercuric nitrate is employed as a caustic for warts, chancroids, mucous patches, etc., and citrine and red precipitate ointments as stimulating applications to ulcers and sores. Mercurial ointments and washes are very serviceable in the treatment of parasitic affections, and also in a variety of other skin diseases, as well as in ophthalmological practice. Internally blue mass and calomel are largely employed as purgatives, and the latter is a good intestinal antiseptic. It is used in serous and other inflammations, and both it and the bichloride have been given in diphtheria. The most important use of mercury is in the treatment of syphilis. In order to secure the best results in this disease it should be commenced early and continued for a considerable time after all symptoms have disappeared. In tertiary syphilis it is commonly combined with the iodides. *Modes of administration of mercurials:* By the mouth; endermatically; by inunction; hypodermatically; intravenous injection; fumigation; inhalation; baths."—(Wilcox's *Materia Medica.*)

7. *Incompatibles of colocynth:* Alkalies, ferrous sulphate, lead sulphate, lime water, mercuric chloride, silver nitrate; of copaiba: Mineral acids, caustic alkalies, calcium hydrate, magnesia, water; of creosote:

Acacia, albumin, nitric acid, oxidizers, and salts of copper, iron, gold and silver; of *aconite:* Acids, alkalies, hot water; of *alum:* Alkaline hydrates, borax, carbonates, galls, kino, lead acetate, lime water, magnesia, magnesium carbonate, mercury salts, phosphates, tartaric acid, potassium chlorate.—(From Potter's *Materia Medica.*)

18. *Hydrocyanic acid poisoning. Symptoms:* "Its action is always rapid. Relatively small doses cause an immediate sense of constriction of the throat, followed in one to two minutes by sense of pressure in the head, vertigo, confusion of intellect, and loss of muscular power. The pulse is quick, the respiration slow and stertorous. Tetanic convulsions and involuntary discharges of urine and feces occur, followed by paralysis. Death follows in from two hours to two days from asphyxia. When large doses are taken no subjective symptoms are observed. The patient loses consciousness in less than one minute. There is a short convulsive seizure, usually accompanied by evacuation of feces, after which the patient lies perfectly still, with no sign of life, save an almost imperceptible pulse and infrequent spasmodic respiratory efforts, in which inspiration is short and expiration protracted. Death follows in from five to twenty minutes."—(Witthaus' *Essentials of Chemistry and Toxicology.*) Death is due to paralysis of the respiratory center and of the motor ganglia of the heart. There is no antidote.

Symptoms of poisoning by oxalic acid: "The sour taste of the acid is rapidly followed by a burning pain, increasing in intensity, in the mouth, throat, and stomach, and persistent vomiting of a dark, 'coffee-ground' material. The pulse becomes small and imperceptible, and the patient dies in collapse, preceded frequently by convulsions, within half an hour. If the case be prolonged, swallowing becomes very difficult and painful; there are numbness and tingling of the skin; twitchings of the facial muscles; convulsions, frequently tetanic; delirium, and lumbar pain. Death occurs in some cases within three to ten minutes, sometimes almost immediately, and in some cases it is delayed for several days."

Cause of death, paralysis of nerve centers. Antidote, syrup of lime.

"The symptoms presented in cases of *poisoning by potash and soda* are so similar that one description will do for both. There is burning pain during swallowing, and an acrid, caustic taste. If the fluid pene-

trates to the stomach, there is persistent burning pain. Vomiting may or may not occur. When it does, the vomitus will usually be brown in color; it may or may not contain blood, and will simulate very closely in appearance that found after the taking of any of the strong acids. *Ammonia* presents rather more violent symptoms in proportion of its strength than does potash or soda, and on account of the irritating quality of its fumes symptoms due to its inhalation are very marked."—(Dwight's *Epitome of Toxicology*).

Cause of death is generally starvation due to stenosis of esophagus, or stomach, or pylorus or intestine. Antidote is vinegar, citric acid, or tartaric acid.

SILVER NITRATE POISONING. *Symptoms:* Pain; vomiting of white, cheesy matter, which becomes black in the sunlight; cramps; purging; depression; convulsions; coma or collapse. *Antidote:* Solution of sodium chloride.

The *symptoms of acute lead poisoning* are: "Metallic taste; dryness of the throat; thirst; severe colicky abdominal pains, referred particularly to the umbilical region, and relieved by pressure; pulse very feeble and slow; great prostration; constipation; urine scanty and red; violent cramps; paralysis of the lower extremities; convulsions, and tetanic spasms."

The antidotal treatment consists in administering "magnesium sulphate, which brings about the formation of the insoluble lead sulphate, while the purgative action of the magnesia is also useful. It should be preceded by an emetic, or by the use of the stomach tube."

CHEMISTRY.

1. *Allotropism* is the capability of a substance to assume different physical properties while retaining the same chemical properties.

Endosmosis is osmosis toward the interior of a vessel or cavity. (*Osmosis* is the passage of a fluid or solution through a membrane or other porous substance.)

Alloy is a substance composed of two or more metals.

Amalgam is an alloy containing mercury.

2. (1) Dilute acetic acid (to acidify alkaline urines before testing for albumin). (2) Nitric acid (to test for albumin and for bile pigments). (3) Fehling's solution (to test for sugar). (4) and (5) Hydrochloric acid and chloroform (to test for excess of indican).

3. *Souring of milk* is due to the formation of lactic acid and succinic acid from the lactose by microorganisms. *Curdling of milk* is due to the presence

of rennin and lactic acid. Soured milk is supposed to prolong life by reducing intestinal putrefaction.

4. *Ptomaines* are basic nitrogenized compounds produced from protein material by the bacteria which cause putrefaction. *Examples:* Putrescin, cadaverin, cholin, neuridin, amantin, muscarin, mydalein.

	CHEMICAL NAME	FORMULA
Sugar of lead	Lead acetate	$Pb(C_2H_3O_2)_2$
Flowers of sulphur	Sublimed sulphur	S.
Blue vitriol	Cupric sulphate	$CuSO_4$
White lead	Lead carbonate	$(PbCO_3)_2$. PbH_2O_2
Red lead	Plumboso-plumbic oxide	Pb_3O_4
Baking soda	Monosodic carbonate	$NaHCO_3$
Quick lime	Calcium monoxide	CaO
Lime water	Calcium hydroxide	CaH_2O_2
Lime stone	Calcium carbonate	$CaCO_3$
Blue stone	Cupric sulphate	$CuSO_4$

6. The paraffin and benzene series are somewhat similar in that they both form halogen derivatives and also alcohols, aldehydes, acids, ketones, nitro compounds and amido compounds.

Two members of the paraffin group—Methane and ethane.

Two members of the benzene group—Benzene and toluene.

7. *Test for albumin in the urine:* The urine must be perfectly clear. If not so, it is to be filtered, and if this does not render it transparent it is to be treated with a few drops of magnesia mixture and again filtered. The reaction is first observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire soldification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3.

For sugar: Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test-tubes. To one test-tube add a very minute quantity of powdered subnitrate of bismuth; to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

For pus in the urine: Acidify the urine with acetic acid, then filter it, and treat the filter with a few drops of freshly prepared tincture of guaiacum; a deep blue color denotes the presence of pus.

To examine for indicanuria: "The urine is mixed with one-fifth of its volume of 20 per cent. solution of lead acetate and filtered. The filtrate is mixed with an equal volume of fuming hydrochloric acid containing 3:1000 of ferric chloride, a few drops of chloroform are added, and the mixture strongly shaken one to two minutes. With normal urine the chloroform remains colorless or almost so; but if an excess of indoxyl compounds be present the chloroform is colored blue, and the depth of the color is a rough indication of the degree of the excess."—(Witthaus' *Essentials of Chemistry and Toxicology.*)

Test for chyle in the urine: "As the chyle contains serum albumin it would respond to the tests for that substance. To make out the fatty character of the molecular basis, a portion of the urine should be agitated with ether and potassium hydroxide, which dissolves the envelopes, and melts the fat particles together as a surface layer, leaving the urine clear beneath. The microscopic character is much like that of milk—that is, it contains myriads of small bright round particles which dissolve in ether."—(Holland's *Medical Chemistry.*)

8. "Milk is adulterated by the addition of water, by dilution, by subtraction of cream or skimming, by both watering and skimming, by the addition of thickeners, coloring, etc., and by the addition of artificial preservatives; it is also regarded as adulterated when it is below a certain chemical or bacteriological standard which is prescribed by a state or municipality."—(Price's *Epitome of Hygiene.*)

To test, a lactometer and creamometer are necessary, and various chemical tests should be made for the presence of formaldehyde, boric acid, borax, salicylic acid, and sodium carbonate or bicarbonate. These tests are too lengthy to be described here; and can be found in standard works on Food Analysis.

PATHOLOGY

1. "The terminal branches of the coronary vessels are end-arteries; that is, the communication between neighboring branches is through capillaries only. The blocking of one of these vessels by a thrombus or an embolus leads usually to a condition which is known as —(*a*) *anemic necrosis*, or white infarct. When this does not occur the reason may be sought in (1) the existence of abnormal anastomoses, which by their presence take the coronary system out of the group of end-

arteries; or (2) the vicarious flow through the vessels of Thebesius and the coronary veins. The condition is most commonly seen in the left ventricle and in the septum, in the territory of distribution of the anterior coronary artery. (*b*) The second important effect of coronary-artery disease upon the myocardium is seen in the production of fibrous myocarditis. This may result from the gradual transformation of areas of anemic necrosis. More commonly it is caused by the narrowing of a coronary branch in a process of obliterative endarteritis. Where the process is gradual evidences of granulation tissues are often wanting, and any distinction between the necrotic muscle fibers and the new scar tissue is difficult to establish. The sclerosis is most frequently seen at the apex of the left ventricle in the septum, but it may occur in any portion. In the septum and walls there are often streaks and patches which are only seen in carefully made serial section. Hypertrophy of the heart is commonly associated with this degeneration. It is the invariable precursor of aneurism of the heart."—(Osler's *Practice of Medicine.*)

2. *Appendicitis:* "In the mildest or catarrhal form there is merely retention of the contents of the appendix and slight disease (swelling and erosion) of the mucosa. The muscularis and serous coat may be congested and edematous, but are not extensively involved. The contents of the appendix are more or less mucopurlulent in character. In the necrotic or gangrenous form the mucous membrane suffers rapid destruction and the muscular and serous coats are quickly invaded. Fibrinous peritonitis soon develops in the serous coat and over the adjacent intestines, either as a result of penetration of bacteria through the walls of the appendix, or in consequence of perforation of the walls. The local peritonitis serves the purpose of restraining the infective disease and prevents diffuse peritonitis. In cases of rapid gangrene, with early rupture or escape of abundant bacteria, general peritonitis may result before a restraining wall can be formed."—(Stengel's *Pathology.*)

3. By *infection* is meant the invasion of the living tissues by living microorganisms which grow and multiply at the expense of the host. If only one kind of microorganism invades the host, it is a *primary infection;* if two or more kinds of bacteria are associated in this invasion, the result is a *concurrent* or *mixed infection;* a *terminal infection* is one occurring after a long period of weakness of the host, when a micro-

organism which would be powerless under ordinary conditions causes an infective process which is often fatal.

4. *Pathology of acute anterior poliomyelitis:* "The primary changes are in the vessels of the anterior horn (anterior spinal artery), which are congested, distended, and surrounded by small-celled infiltration. Thrombosis is common, but not necessarily present. Secondary interstitial changes take place in the gray matter, and its multipolar cells undergo cloudy swelling and ultimate destruction. Degenerative changes can be traced into the anterior roots. Later, the motor nerve trunks show marked change, the fibers being smaller and fewer in number. The neuroglia becomes increased, and the anterior horn as a whole is sclerosed and shrunken. The muscles are pale and flabby; atrophy begins early and is well marked; and microscopically, they show the changes already referred to, as the result of destruction of their trophic center. In the epidemic form there may be vascular irritation and cellular infiltration in the higher centers, but the ganglion cells of the medulla, pons, and optic thalamus usually escape; Flexner describes extensive hyperplasia of lymphoid tissues, and necrosis of small groups of liver cells."—(Wheeler and Jack's *Handbook of Medicine.*)

5. "The *causes of rapid death in the puerperium* may be any of the following: Accidents of labor, such as hemorrhage and shock following placenta prævia, accidental or post-partum hemorrhage, rupture or inversion of the uterus; rupture of a hematoma situated either externally on the vulva or within the pelvic cavity; rupture of peritoneal adhesions or of a broad ligament or an ovarian vein; acute purpura hæmorrhagica; cerebral embolism or apoplexy; hemoptysis; pre-existing diseases of the respiratory or circulatory system so grave as not to withstand the strain of labor, which is followed by extreme exhaustion and rapid death.

"Analysis of the recorded cases of *sudden death* include the following causes: Heart failure which has resulted from rupture of the heart due to fatty degeneration, to a patch of fibroid degeneration, to acute myocarditis. Sudden arrest of the heart's action has followed primary thrombosis in the right side of the heart, the thrombus extending into the pulmonary artery, or more frequently the cause of death has been embolism of the pulmonary artery. Rupture of a cyst in the auricular septum of the heart, of an aneurysm, of

the aorta itself, and an attack of angina pectoris have caused immediate death. Mental emotion, such as profound impression of sorrow, of joy, of anger, of exaggerated shame, of excessive pain, or of fear, has caused sudden death by producing syncope, the heart's action being interrupted by energetic and persistent excitation of the inhibitory nerves of the heart. Sudden death has followed the entrance of air into the uterine sinuses; a fatal case has been recorded from embolus of fat from the pelvic connective tissue, and death in the puerperium has followed rupture of a gastric ulcer and of a liver-abscess. The most frequent causes of sudden death in the puerperium, arranged in the order of their relative frequency, are embolism, entrance of air into the uterine veins, and heart failure, due usually to organic disease."—(American *Text-Book of Obstetrics.*)

The post-mortem findings will depend on the pathological condition present.

6. "In *mitral stenosis* there is an increase in the intra-auricular pressure toward the end of auricular diastole, due to the blood from the lungs flowing into an insufficiently emptied auricle; the consequent dilatation and stretching excite the auricle to very vigorous contractions, which become augmented in consequence of the obstruction to the discharge of blood. The result is an extraordinary enlargement (hypertrophy and dilatation) of the left auricle, which may attain dimensions three or four times the normal. Increased intra-pulmonary pressure is followed by hypertrophy and dilatation of the right ventricle, which as in mitral insufficiency is the efficient factor in maintaining compensation. In some cases, for a time at least, the increased power of the left auricle serves to supply a normal amount of blood to the left ventricle, which in consequence presents no noteworthy deviations from the normal. In many cases, however, on account of associated mitral insufficiency, the left ventricle is somewhat enlarged; in most cases the amount of blood supplied to the left ventricle is less than normal, in consequence of which it is often said to become reduced in size (this is more apparent than real)."—(Kelly's *Practice of Medicine.*)

"When compensation fails the various organs of the body suffer congestion. The lungs are first affected in disease of the left heart (mitral and aortic disease). The capillaries of the pulmonary alveoli become over full and encroach upon the lumen of the alveoli, or by elongation stretch the alveolar walls and render them inelastic. *In either* case proper respiration is prevented

—a condition which is further aided by the retarded pulmonary circulation. As a result of these conditions, dyspnea (cardiac asthma), cough, and expectoration develop. In extreme cases edematous exudation takes place, and in long-continued cases cyanotic induration of the lung occurs. In such instances there may be continuous cough and respiratory insufficiency. When the right heart fails, the liver, spleen, gastro-intestinal mucosa, the kidneys, and the peripheral circulation suffer congestion. The liver may become greatly engorged, and in certain cases actually pulsates with each ventricular systole. The swollen liver-cells and the engorged vessels cause obstruction of the biliary capillaries, and consequently produce jaundice. To some extent this may be due to associated congestion of the biliary channels. Congestion of the gastro-intestinal mucosa may occasion various forms of gastric or intestinal derangement."—(Stengel's *Pathology.*)

7. *"Pott's disease":* The lower dorsal region is the commonest situation, but any part may be affected. The disease begins—(1) Under the periosteum of the anterior surface of the bodies of the vertebræ. The disease spreads to the adjacent vertebræ. The bodies and intervertebral discs are destroyed, so that a gradual curvature is produced. (2) In the interior of the bones, near the intervetebral cartilages, and rarely affecting more than one or two vertebræ. As the bones become destroyed the weight of the body causes the vertebræ above to sink down, and so more or less acute curvature results. The disease may run its course with or without suppuration."—(*Aids to Surgery.*)

8. An *autogenous vaccine* is one that is prepared from material derived directly from the patient who is to be inoculated with it. *Vaccine therapy* is based on the supposition that bacterial vaccines when introduced into the patient's body cause a condition of active immunity against the corresponding pathogenic germs or their toxins; it is further believed that they raise the opsonic value of the blood and so promote phagocytosis of the invading bacteria.

PRACTICE.

1. *Pain in the chest may be due to:* Anemia, intercostal neuralgia, pleurodynia, pleurisy, pneumonia, phthisis, mediastinal tumor, enlarged bronchial glands, herpes zoster, disease of the vertebræ, angina pectoris, pseudo-angina, pericarditis, gastralgia, gastric neuroses, gastric ulcer, gastric cancer, ulcer of duodenum, aneurysm.

2. *Uremia* may occur in the course of acute nephritis, chronic nephritis, puerperal eclampsia, and when there is obstruction to urinary excretion. *Remedies*—Hot pack, to increase elimination by the skin; elaterin, to increase elimination by the bowels; nitroglycerin, to lower arterial tension; strychnine and digitalis, to support the heart; chloral or chloroform for the convulsions; sometimes venesection and hypodermoclysis will cause general relief from all the symptoms.

3. *Koplik's* spots are small red spots with a bluish-white center, found on the inner surface of the cheeks; they occur in the beginning of measles, prior to the appearance of the rash.

Romberg's Symptom: The patient stands with eyes closed and heels together; extensive swaying of the body occurs if the patient has ataxia of the lower extremities; found in locomotor ataxia.

Argyll-Robertson pupil: The pupil responds to accommodation, but not to light; found in locomotor ataxia, intracranial syphilis, and progressive paralysis of the insane.

Babinski's reflex: When the sole of the foot is tickled there is extension of the toes instead of flexion; occurs in lesions of the pyramidal tract, organic hemiplegia.

Kernig's sign: The patient lies with the thighs flexed upon the abdomen and the legs flexed upon the thighs; if cerebrospinal meningitis is present it will be impossible to extend the legs.

Stokes-Adams syndrome is a complex consisting of slow pulse, cerebral disorders (as vertigo, syncope), and visible auricular pulsation in the veins of the neck. It occurs in heartblock.

4. *Tumor of the brain:* Chief symptoms are headache, vertigo, vomiting, optic atrophy, choked disc, slow pulse, convulsions, and the focal symptoms (which vary according to the location of the tumor).

Pulsating jugulars may denote: Anemia, tricuspid stenosis or regurgitation; the condition may be observed in health.

5. CARDIAC HYPERTROPHY: "*Inspection* reveals fullness or prominence of the precordium with a distinct impulse. *Palpation* detects the impulse one or two intercostal spaces lower down and to the left. It is stronger and more or less diffused—the heaving impulse. *Percussion* determines an increase in the area of cardiac dullness vertically and transversely on the left side of the sternum, unless the right ventricle is also hypertrophied, when the cardiac dullness is in-

creased to the right of the sternum. *Auscultation* in simple hypertrophy without any valvular changes detects a loud first sound of a somewhat metallic quality, the second sound being strongly accentuated. In the presence of valvular disease the characteristic murmurs are heard in addition."—(Hughes' *Practice of Medicine.*)

CARDIAC DILATATION: "*Inspection* detects enlargement and distention of the superficial veins and an indistinct, often wavy and diffused, cardiac impulse. If tricuspid regurgitation is present jugular pulsation will be observed. *Palpation* confirms inspection; the impulse is feeble, irregular, and heaving. *Percussion* serves to determine extension of the area of cardiac dullness transversely and especially toward the right side. *Auscultation* in the presence of valvular lesions reveals characteristic murmurs. If there are no valvular lesions the cardiac sounds are weaker than normal and the first sound is sharper in quality than usual."—(Hughes' *Practice of Medicine.*)

6. CEREBROSPINAL MENINGITIS. *Cause:* The *diplococcus intracellularis meningitidis. Symptoms:* "The symptoms depend upon the area most affected. If the meninges of the brain are diseased, there are delirium, stupor, paralysis of ocular muscles, disturbed vision, deafness and semi-consciousness. If the meninges of the cord are the seat, there will be opisthotonos, hyperesthesia, paresthesia, rigidity and tremor of the extremities, localized spasms of the muscles, which, if irritated, often cause a general convulsion. The onset is characterized by anorexia, malaise, pain in the back of neck, head, and down the spine, slight rise of temperature, chill, or convulsion. Vomiting comes on early, and the pain in the back and head increases. The temperature is not usually high—about 102°—very irregular, and without the diurnal variation so common in typhoid fever. The pulse is full and strong. Intolerance to light and sound is a prominent feature. The skin becomes hypersensitive and a petechial rash appears, hence the synonym—spotted fever. Trophic changes may occur and herpes is common. This is generally a leucocytosis. To test for the distinctive Kernig's sign, the patient lies with the thighs flexed upon the abdomen and the legs flexed upon the thighs; if meningitis is present extension of the legs is impossible, being prevented by the contraction of the hamstrings. Delirium is present usually from the onset, and may be so prominent as to give rise to maniacal outbreaks. The urine is high-colored, scanty, and may

contain albumin. Late in the disease it may be passed involuntarily. Occasionally the joints may be swollen." *Treatment:* "Rest in bed, liquid diet, ice-bags to the head, and counterirritation to the back are essential. Pain and restlessness are relieved by morphine, the bromides and chloral. The bowels should be freely opened, and the bladder should be emptied by catheterization, if necessary. The fluidextract of ergot, gtt. 10-20, may be given. Lumbar puncture and laminectomy are sometimes necessary. Alcohol, digitalis and quinine are of value. During convalescence potassium iodide, tonics, rest and quiet, massage, and electricity are indicated. In case of epidemic cerebrospinal meningitis the serum treatment should be resorted to."—(*Pocket Cyclopedia of Medicine and Surgery.*)

SYMPTOMS OF TUBERCULOUS MENINGITIS. "*Prodromal:* The child usually shows more or less definite symptoms of the tuberculous diathesis, such as emaciation, want of appetite, or constipation alternating with diarrhea. Irritability of temper and headache are perhaps the most common features previous to the onset of definite symptoms of the meningeal affection. Such a condition may last a few weeks or months. *Irritative Stage.*—The symptoms are similar to those of the simple variety, but the head is usually more retracted and the neck more rigid; the abdomen is hollowed out or boat-shaped; the temperature oscillates; internal strabismus or other paralysis of cranial nerves may be present, and there is often marked vasomotor paralysis, manifested by the *tache cérébrale* (a red line upon the skin rapidly following a stroke of the finger nail). This, however, is not diagnostic. Vomiting is very constantly present, and may or may not be related to food. The pulse is irregular and slow. This stage continues for a week or so. *Compression Stage.*—The pulse becomes more rapid with the exhaustion of the heart, the symptoms that accompany coma develop, and death may take place in from ten days to six weeks from the onset of acute symptoms. In the *adult* delirium may take the place of convulsions. The course of the disease is more rapid than in children, as the skull cannot expand, and hence intracranial pressure develops more quickly."—(Wheeler and Jack's *Handbook of Medicine.*)

7. *Displaced apex-beat may be due to:* Pericardial effusion, distention of abdomen, pleural effusion, dilatation or hypertrophy of the heart, emphysema, aneurysm of arch of aorta, mediastinal tumors, hydrothorax, pneumothorax.

For physical signs of dilatation and hypertrophy of the heart, see QUESTION 5.

8. HERPES ZOSTER: *Diagnosis* is made by the pain, and eruption along the course of a cutaneous nerve (generally one of the intercostal nerves); it is generally unilateral; the vesicles show no tendency to rupture. *Treatment:* Flexible collodion or a dusting powder locally, to protect the vesicles; antipyrin or phenacetin or morphine for the pain, and zinc phosphide and nux vomica as a nerve tonic.

The gonococcus or some other pyogenic microorganism is the cause of most cases of early blindness. *Preventive treatment:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth.

OBSTETRICS.

1. The *bones* of the pelvis are: Innominate (consisting of ilium, ischium and pubes), sacrum and coccyx; the *divisions* are true and false pelvis; the *straits* are superior and inferior; the *symphyses* are pubic, sacro-iliac and sacrococcygeal.

The chief differences between the male and female pelvis are thus tabulated in Morris's *Anatomy:*

MALE.	FEMALE.
Bones heavier and rougher.	Bones more slender.
Ilia less vertical.	Ilia more vertical.
Iliac fossæ deeper.	Illiac fossæ shallower.
False pelvis relatively wider.	False pelvis relatively narrower.
True pelvis deeper.	True pelvis shallower.
True pelvis narrower.	True pelvis wider.
Inlet more heart-shaped.	Inlet more oval.
Symphysis deeper.	Symphysis shallower.
Tuberosities of ischia inflexed.	Tuberosities of ischia everted.
Pubic arch narrower and more pointed.	Pubic arch wider and more rounded.
Margins of ischiopubic rami more everted.	Margins of ischiopubic rami less everted.
Obturator foramen oval.	Obturator foramen triangular.
Sacrum narrower and more curved.	Sacrum wider and less curved.
Capacity of true pelvis less.	Capacity of true pelvis greater.

2. The *internal female organs of generation* are: Ovaries, Fallopian tubes, uterus and vagina.

The virgin uterus is about three inches long, about two inches wide at the upper part, and about one inch thick; it weighs about an ounce, or an ounce and a half. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine and rectouterine. It is pear-shaped; its cavity is very small; it is divided into fundus and cervix; besides the opening at the os there is an opening on each side near the fundus leading into a Fallopian tube; it is lined by mucous membrane, and covered by serous membrane. The nerves are from the hypogastric and sacral plexus, and from 3d and 4th sacral nerves. The arteries are the uterine and ovarian.

3. *Menstruation* is a periodical disturbance in the female, characterized by a bloody mucus discharge from the uterine cavity; it lasts during the period of woman's sexual activity, but is temporarily suspended during pregnancy and early lactation.

A woman usually menstruates about two or three months after her confinement if she *is not* nursing her child, and about seven months after the confinement if she *is* nursing her child.

4. *During pregnancy* the uterus increases in *size* (from 3 to 12 inches in length; from 1½ to 9 inches in breadth), in weight (from about one ounce to two pounds, not including its contents). The cavity is enlarged over 500 times. All the tissues, muscles, ligaments, arteries, veins, lymphatics, and nerves become tremendously hypertrophied. The uterus also changes its position; at first it drops, later it gradually rises, till just before labor (when it again drops).

VIRGIN UTERUS	UTERUS OF MULTIPARA
The cavity is of normal length and triangular.	The cavity is increased in length and oval.
The cervix is small, hard, and cartilaginous, and of the same length as the body.	The cervix is large and soft; it is about one-half the length of the body.

VIRGIN UTERUS.	UTERUS OF MULTIPARA.
The external os is a transverse slit or pinhole orifice with smooth edges.	The external os is irregular and its edges are fissured.
The sides of the cavity of the body are convex inward.	The sides of the cavity of the body are convex outward.
The uterus is normally anteflexed.	The uterus is straighter, or even retrodisplaced.
There is more or less flattening of the anterior and posterior uterine surfaces.	The contour of the uterus is more rounded, while its diameters are increased.
The fundus is nearly flat	The fundus is convex.
The internal os is closed.	The internal os is patulous.

—(From Dorland's *Obstetrics.*)

5. As a rule a diagnosis cannot be made till the pregnancy is nearly half over, and the most skilful can hardly obtain absolutely positive signs during the first sixteen weeks.

Positive signs of pregnancy: (1) Hearing the fetal heart sound; (2) active movements of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation, and (5) the umbilical or funic souffle.

5.—

PREGNANCY.	OVARIAN TUMOR.
The usual signs of pregnancy are present.	There is an absence of the chief sign of pregnancy, as a general rule.
The patient is generally in good health, with an increase of body-weight; there is no characteristic facies.	In advanced cases the ovarian facies is present—a pale, drawn expression, with yellowness of the skin and general emaciation.
The abdominal tumor is hard, non-fluctuating, situated in the median line, and reveals the fetal signs.	The abdominal tumor is soft, fluctuating, showing usually more or less growth to one or the other side, and does not reveal the fetal signs.
There is generally a suppression of menstruation.	Continuance of menstruation is the rule, although it may be altered in character; suppression has been noted.

PREGNANCY.	OVARIAN TUMOR.
The cervix is soft (Goodell's sign).	The cervix is probably not altered.
There is history of exposure to the possibility of impregnation, with rapidly-developing enlargement in the median line.	The history is obscure, with a slowly-developing tumor beginning on one or the other side.

—(Dorland's *Obstetrics.*)

Pregnancy: The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ascites: Absence of the signs of pregnancy; the abdomen is distended, but the shape varies with the position of the patient; on lying down there is bulging at the sides, the tumor fluctuates, and percussion shows dullness in the flanks, with resonance in the median line, but the dullness varies with the position of the patient.

Gas: Absence of signs of pregnancy; the uterus enlarges more slowly than in pregnancy, and when large enough is resonant on percussion and lighter to the palpating finger in the vagina.

6. *Before Labor:* "Comparatively little can be accomplished by any specific treatment of the breasts and nipples, except frequent bathing to prevent the accumulation of crusts from the drying of the secretion which in many instances is considerable. Small and slightly protruding nipples may be lengthened somewhat by gentle traction practised two or three times a day during the latter part of pregnancy. Nipples that are markedly retracted cannot be appreciably improved. Daily bathing with a mild solution of alum in 50 per cent. alcohol will help to harden them and thus aid in the prevention of fissures during the puerperium."—(Jewett's *Obstetrics.*)

"*After the birth*, the nipples need special care to prevent the formation of fissures. The nurse should cleanse the nipple before and after each nursing with a bland antiseptic solution such as a saturated solution of boric acid, to which one-eighth (⅛) part of glycerin has been added; while before each nursing the child's mouth should be cleansed in a like manner with a saturated solution of boric acid, care being used to avoid injury to the buccal epithelium from too vigorous handling. Excessive nursing must not be permitted, for the nipple is injured by long continued maceration, and avenues for infection are opened. The nurse must be warned of the risk of carrying infection to the nipples or to the child, when her hands are soiled from handling the lochial guard. The nipple should never be touched by the nurse until she has first thoroughly disinfected her hands."—(Polak's *Obstetrics.*)

7. *To facilitate a tedious or painful labor:* Remove the cause, if possible; see that the bladder and rectum are empty; rectal injections of glycerin; pituitrin, strychnine, quinine or other stimulants may be administered; uterine massage may be tried; the patient may assume the semi-recumbent or squatting posture during the pains.

8. They should not undertake any obstetric work without having taken more than the ordinary antiseptic precautions. A thorough bath, use of antiseptics, and clean clothes should form part of this care.

SURGERY.

1. The patient feels a snap at the time of injury, and suffers from pain, increased during inspiration. If the back is fixed and the sternum firmly pressed back, pain is felt at the middle of the rib. Crepitus may or may not be felt. *Complications:* Puncture of pericardium, pleura, heart, lung, or other viscera; emphysema; pneumothorax; pyothorax; pleurisy; pneumonia.

Treatment: Strips of plaster reaching from the spine to the sternum should be placed over the injured side during deep inspiration. The strips should overlap, and a bandage should be put on over the plaster. If the fracture is due to direct violence, no strapping should be used, but the patient kept still by placing sand-bags on either side.—(*Aids to Surgery.*)

2. *Toxemia or sapremia* is due to absorption of toxins only.

Septicemia is due to organisms multiplying in the blood.

Pyemia is due to particles of blood-clot carrying or-

ganisms to parts distant from the original source, and there setting up abscesses.

3. *Etiology:* Infection from nasopharynx or ear, exanthemata, grippe, inflammation of middle ear. *Symptoms:* Tenderness, pain, swelling, and redness over the mastoid; bulging of the superior and posterior parts of the auditory canal; temperature variable, from normal up to about 104° F. *Treatment:* Hot water, or cold water, or ice; leeches; purgatives; light diet; acetanilid; incision, or mastoid operation. *Operation:* A semicircular incision of the soft parts is carried from a point about one-half inch above the attachment to the auricle, backward and downward, keeping parallel to the auricular attachment and terminating at the tip of the mastoid. The periosteum is now elevated or dissected from the bone and the osseous structure thoroughly exposed by means of retractors, which are held by an assistant, the auricle being pulled forward so as to lie upon the side of the head. The hemorrhage is controlled by the use of hot sponges and artery forceps. The surface of the mastoid is thoroughly examined for areas of necrosis or the existence of a fistulous opening, especially if a fluctuating swelling obtains previous to the operation. If these exist, the openings are enlarged by means of a gouge or a chisel and mallet, and followed inward to their origin. Should the surface present a healthy appearance, the primary opening of the mastoid is made into the antrum by means of the chisel, the point of entrance being effected just below the line of the superior wall of the meatus and about one-quarter of an inch backward from the posterior wall or anterior edge of the mastoid bone. When the antrum has been exposed, the cortex of the mastoid is chiselled away from this point downward toward the tip until a sufficient amount has been removed to expose all parts of the mastoid process. The cells are now all broken down, and every vestige of a necrotic or granulating area is completely eradicated. A free communication of the antrum with the tympanum should be established, which may be proved by syringing an antiseptic solution into the antrum, when it will escape from the external auditory meatus through a previous perforation of the drumhead. The cavity of the mastoid is packed with sterile gauze, and the flaps of overlying tissue allowed to regain their former position, when a gap remains between their edges, through which the dressings may be changed.—(From Alling and Griffin's *Epitome on Eye and Ear.*)

4. In a *simple fracture*, there is history of the in-

jury, disability, deformity, pain, false point of motion, and possibly crepitus; in *compound* fracture, in addition to the above, there is an open wound leading down to the site of fracture; in *comminuted* fracture, the bone or bones are broken into small pieces. Constitutional effects (due to hemorrhage, shock, sepsis, or other complications) may follow. *Treatment of simple* fracture: First of all, prevent it from becoming compound, then reduce it, coapt the edges of the broken bone, immobilize the parts, and attend to the general condition of the patient. In *compound* fractures: Give an anesthetic, thoroughly asepticize the parts, stop the hemorrhage, remove loose fragments of bone, fix the bones, drain, and immobilize; the wound wants careful antiseptic treatment. The leg must be flexed on the thigh to aid in reducing the fracture, and it may be necessary to cut the tendo Achillis. Splints will be necessary.

5. The damages produced by dislocation are tearing of the capsule and surrounding muscles, and perhaps fracture of the cartilaginous or bony surfaces. The joint and surrounding soft tissues are infiltrated with blood. Vessels and nerves in the neighborhood may be contused or compressed. If allowed to remain unreduced, the displaced head becomes surrounded by a false joint capsule, the true articular cavity becomes filled up with fibrous tissue, and the muscles and tendons around become shortened, while adhesions to big vessels close at hand constitute a danger in attempted reduction.

Treatment: All dislocations should be reduced in the earliest stages, either by manipulation or extension. Manipulation aims at making the bone retrace the course by which it left its proper position. Anesthesia renders this very easy by overcoming the spasmodic contraction of the muscles. Extension is employed to overcome muscular contraction. The hands, a jack-towel, and pulleys are used for this purpose. The reduction is usually marked by a distinct snap. The bones are then felt to be in their normal relation, and normal mobility is restored. Rest for a few days and early passive movements soon repair the damage done. —(*Aids to Surgery.*)

6. *Malignant tumors* are not encapsulated, tend to infiltrate the surrounding tissues, give rise to metastatic growths, have a tendency to recur after removal, give a cachexia, have a fatal tendency.

Benign tumors are encapsulated, do not tend to infiltrate the surrounding tissues, do not give rise to meta-

static growths, do not tend to recur after removal, do not produce cachexia, and do not have a fatal tendency (except from their location.)

Two malignant tumors: Carcinoma and sarcoma.

Two benign tumors: Fibroma and lipoma.

7. The *symptoms* consist of aching pain in the loin and frequent micturition. Hematuria comes on early and without apparent cause, is not increased by movement or improved by rest. Pus is usually present in acid urine, and the *Bacillus tuberculosis* may in some cases be detected. In the late stages the kidneys may be felt much enlarged. The *diagnosis* is doubtful in the early stages, unless bacilli can be demonstrated by the microscope or inoculation of a guinea-pig. The hematuria is much slighter than in cases of renal calculus, and is not influenced by rest. The hemorrhage is not so profuse as in cases of new growth. Slight attacks of renal colic may occur from the passage of caseous matter, but not severe attacks like those due to calculus. An exploratory incision settles the diagnosis in doubtful cases. *Treatment:* If on exposure of the kidney a limited portion is found to be diseased, a wedge-shaped portion is excised. If, as is more usual, the kidney is extensively affected, two methods may be adopted: (1) If the other kidney is healthy, nephrectomy with removal of as much of the ureter as possible is done. (2) Nephrotomy, followed by drainage, is done when the patient's condition is bad.

8. ERYSIPELAS. "*Etiology: Predisposing causes:* (1) A wound or abrasion; (2) constitutional debility; (3) bad hygiene. *Exciting cause: Streptococcus erysipelatis,* which is indistinguishable from *S. pyogenes.*

Symptoms: Malaise with rigor and headache. Rash appears within twenty-four hours; it appears first round the wound, which breaks open; it is of a vivid red color, which fades on pressure. Pain and swelling are not much marked. The eyelids and scrotum when affected become very edematous. Vesicles and bullæ form superficially, and a fine desquamation occurs, with some staining of the skin as the rash fades away. Lymphatic glands in the neighborhood are enlarged and tender. The patient is very ill, with high temperature—102°-104° F. Delirium is frequent, especially when the scalp is affected. Vomiting is common.

Varieties: Facial erysipelas is often apparently idiopathic and recurrent. *Faucial erysipelas* spreads from the exterior to the pharynx; causes great swelling of the parts, with a tendency to edema glottidis. *Scrotal erysipelas* causes great edema, and in children a ten-

dency to sloughing. *Cellulo-cutaneous erysipelas* partakes of the character of both cellulitis and erysipelas, affecting the skin and subcutaneous tissue.—(Grove's *Synopsis of Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

THE TEXAS STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Give the location and shape of the frontal bone, and name the bones with which it articulates.
2. What structures are used in the formation of an articulation, and what three classes of articulations are there?
3. Name the triangles of the neck and their subdivisions, and give boundaries of each.
4. Describe the diaphragm and give origin and insertion.
5. Give location of the subclavian arteries and tell origin of.
6. Give origin and distribution of the pneumogastric nerve.
7. Where does the liver get its blood supply?
8. Give abdominal surface location of the gall-bladder and appendix.
9. What constitutes the sympathetic nervous system?
10. Describe and give location of the inguinal canal.

PHYSIOLOGY.

1. Define physiology.
2. Name the elementary tissues.
3. Name the kinds of muscular tissue.
4. Describe briefly the blood.
5. What is an "internal secretion"? Name five organs which have such.
6. If the pneumogastric nerves were severed, what would be the effect on the heart?
7. Where are the plexuses of Auerbach and Meissner located? Their function?
8. Where are the Malpighian bodies found? State their function.
9. Name the organs of excretion in order of their importance.
10. Where are the cardioinhibitory and cardioaccelerator centers located?

CHEMISTRY.

1. What is an element? A compound? An example of each.

2. Define a deliquescent salt; efflorescent salt.
3. In Marsh's test for arsenic, how do you differentiate arsenic from antimony spots?
4. (*a*) Give a process for making chlorine gas. (*b*) Give properties of chlorine gas. (*c*) Of what value is this gas?
5. What is an acid? What is a base? Complete the equation $2NACl + H_2SO_4$.
6. Define normal salt, basic salt, acid salt.
7. Describe iodine as found in the market. (*b*) Test for iodine.
8. How is chloral hydrate prepared? (*b*) Physiological properties of chloral hydrate.
9. From what source do we obtain pure genuine salicylic acid?
10. Give test for morphine sulphate.

HISTOLOGY.

1. Name and describe membranes of brain.
2. Give the structure of human skin.
3. Locate and give structures of Peyer's patches.
4. Give structure of the thyroid gland.
5. Give a histological difference between pyloric and cardiac ends of stomach.
6. Give the development of bone.
7. Draw cross section of spinal cord at tenth dorsal, and name findings.
8. Give histological difference between veins and arteries.
9. Give histological structure of lymphatic gland.

BACTERIOLOGY.

1. Describe the Wassermann reaction.
2. Define alexins, agglutinins, and precipitins.
3. Define diapedesis, phagocytosis; of what use is the process of phagocytosis in the human system?
4. State names of the stains used to demonstrate the presence of the following microorganisms: staphylococcus, streptococcus; the negri bodies of hydrophobia.
5. State methods of making a culture of the Klebs-Loeffler bacillus.
6. Define toxins, endotoxins, and autotoxins.
7. Give morphology of pneumococcus and the parasite of malaria (any variety).
8. Describe the Widal reaction and von Pirquet's method of cutaneous diagnosis of tuberculosis.
9. What pus-producing microorganism causes the greatest mortality, and give names of principal diseases in which it is a principal cause of destruction.
10. Define flagellated and name all the flagellated pathogenic organisms.

MEDICAL RECORD.

OBSTETRICS.

1. Give the symptoms and management of puerperal infection.
2. Give the blood supply of the uterus.
3. What are the changes that take place in the circulatory apparatus of the fetus after birth?
4. Give differential diagnosis between uterine fibroma and pregnancy.
5. Give indications for use of forceps and for cesarean section.
6. Give the hygiene of pregnancy.
7. Name three of the most frequent diseases to which pregnancy predisposes, select one and give symptoms of same.
8. Give three indications for induction of premature labor and describe one method of performing the same.
9. Give the proper treatment of ophthalmia neonatorum.
10. Give the definition of premature labor and abortion.

GYNECOLOGY.

1. Outline your scheme for taking a gynecological history.
2. (*a*) What are the advantages and disadvantages of Pfannensteil's incision? (*b*) Enumerate in order of importance the causes of metrorrhagia.
3. Describe a standard perineorrhaphy (secondary).
4. What precautions should be taken in making a vaginal examination of a virgin?
5. A married woman, aged 40 years, with one child, aged 14 years, and no subsequent pregnancies, is in good health until suddenly seized with violent pain in left lower abdomen and collapses; suggest two diagnoses.
6. Criticise ventrofixation and ventrosuspension uteri.
7. What conditions justify double ovariectomy?
8. What surgical procedure would you advise to correct procidentia with cystocele and rectocele in a woman 50 years of age?
9. Name the contraindications of uterine curettage.
10. Would you leave the appendix, in abdominal operations for other conditions? Reasons for your answer.

PATHOLOGY.

1. What is a tumor (new growth)? (*a*) Classify tumors as to the tissues from which they arise. (*b*) Give examples.
2. What constitutes malignancy? (*a*) By what channels are metastases carried?

3. Describe the stages of simple inflammation.
4. Describe the pathological process leading to destruction of the valve in mitral insufficiency.
5. Give in detail the blood picture of pernicious anemia.
6. What systemic pathological changes are usually associated with contracted kidney? (Interstitial nephritis.)
7. Give the pathological changes in the intestines in typhoid.
8. Describe the gross and microscopical appearance of a gumma of the liver.
9. Describe in detail the pulmonary changes in the various stages of croupous pneumonia.
10. Give pathological changes in amebic dysentery.

PHYSICAL DIAGNOSIS.

1. What are the methods of physical diagnosis?
2. By what symptoms would you diagnose Pott's disease (of spine)?
3. Give use of sphygmomanometer. (*b*) What is blood pressure?
4. State in what diseases we would most likely observe hypertension and hypotension.
5. Describe the characteristics and significance of the several kinds of arterial pulse.
6. Differentiate organic and functional heart murmur.
7. What are the normal sounds obtained by percussion on the thorax?
8. In what diseases can we employ the microscope as an aid in diagnosis?
9. What are the physical signs of sciatica?
10. What are the physical signs of pellagra?

SURGERY.

1. Difference between acute abscess and carbuncle; organisms usually present in both.
2. Preparation of patient for abdominal section beginning thirty-six hours beforehand. Give after-treatment.
3. Define acute osteomyelitis—give treatment and differential diagnosis between it and acute rheumatism.
4. Treatment of simple fracture at junction of upper with middle third of femur.
5. Diagnosis of chronic duodenal ulcer.
6. What surgical complications may arise in typhoid fever?
7. Differential diagnosis between tuberculous kidney and stone in kidney.

8. How would you put an old man in best physical condition for removal of prostate?
9. Treatment of penetrating wound of right chest.
10. A man receives a blow on top of head; you are called in and observe him unconscious, and with a scalp wound; how would you handle the case?

MEDICAL JURISPRUDENCE.

1. Define rigor mortis; say where it commences, how long it lasts, and its importance from medicolegal standpoint.
2. Differentiate the male and female skeleton.
3. How would you determine whether a stab wound on dead body was made before or after death?
4. What points would help to determine whether a gunshot wound was self-inflicted?
5. Under what conditions may pregnancy become a subject of medicolegal inquiry?
6. Under what conditions is the destruction of a living fetus not considered murder?
7. Give the classifications of insanity.
8. In suspected infanticide how would you determine that the child was born alive?
9. In case of doubtful paternity what points would help to fix the responsibility?
10. Upon what evidence could you sustain a charge of recent abortion?

HYGIENE.

1. Name some of the diseases believed to be acquired by inhalation of microorganisms from the air.
2. How much O does an adult human being at rest ordinarily take from the air and how much CO_2 does he add to it in twenty-four hours? (*a*) How would you arrange for natural ventilation of a schoolroom during cold weather?
3. What quantity of water should be supplied per capita daily by towns and cities for all purposes? (*a*) Mention some diseases that are frequently transmitted by water.
4. What is the probable significance of nitrites or nitrates in water?
5. How is milk most frequently adulterated, and what is the greatest danger in such adulteration?
6. What conditions may render meat unfit for food?
7. Of what disease or diseases is the house-fly a carrier?
8. What precaution should be taken in locating the well or cistern for drinking water on a farm?
9. What precautions should be taken in the handling

of a case of typhoid to prevent the infection of others? (Explain fully.)

10. Describe a reliable method for the disinfection of a room which has been occupied by an infectious patient.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

THE TEXAS STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *frontal bone* is located at the anterior part of the cranium; its shape is that of a cockle-shell; it articulates with the two parietal, the sphenoid, the ethmoid, two nasal, two superior maxillary, two lacrymal, and two malar bones.

2. *Structures entering into the formation of a joint*, are: Bone, cartilage, fibrocartilage, ligament, and synovial membrane.

The *three forms of articulations* are: (1) *Synarthrosis*, or immovable articulation, such as that between the two parietal bones. (2) *Amphiarthrosis*, or mixed articulation, such as that between the two pubic bones. (3) *Diarthrosis*, or freely movable articulation, such as that between the humerus and the ulna.

3. The ANTERIOR TRIANGLE OF THE NECK is *bounded:* In *front* by a line from the chin to the sternum; *behind* by the anterior margin of the sternomastoid; *base* is upward, and is formed by the lower border of the body of the lower jaw and a line from the angle of the jaw to the mastoid process. It is *divided* into three smaller triangles (inferior carotid, superior carotid, and submaxillary) by the digastric muscle and the anterior belly of the omohyoid. The *inferior carotid triangle* is bounded, *in front* by the median line of the neck; *behind*, by the anterior margin of the stermomastoid; and *above*, by the anterior belly of the omohyoid. The *superior carotid triangle* is bounded, *behind* by the sternomastoid; *below*, by the anterior belly of the omohyoid; and *above* by the posterior belly of the digastric. The *submaxillary triangle* is bounded, *above* by the lower border of the body of the mandible and a line drawn from its angle to the mastoid process; *below*, by the posterior belly of the digastric and the stylohyoid; and *in front*, by the anterior belly of the digastric.

THE POSTERIOR TRIANGLE OF THE NECK is *bounded:* In *front* by the sternomastoid; *behind*, by the anterior margin of the trapezius; and its *base* corresponds to

the middle third of the clavicle. It is *divided* into two smaller triangles (the occipital and the subclavian) by the posterior belly of the omohyoid. The *occipital triangle* is bounded *in front*, by the sternomastoid; *behind*, by the trapezius; and *below*, by the omohyoid. The *subclavian triangle* is bounded *above*, by the posterior belly of the omohyoid; *below*, by the clavicle; and in *front*, by the sternomastoid.

4. The *diaphragm* is a musculofibrous septum which divides the thoracic from the abdominal cavity; it is fan-shaped; the broad elliptical portion is horizontal, and the crura are vertical. It is attached to the ensiform, to the internal surfaces of the lower six costal cartilages, to bodies and intervertebral substances of first, second, and third lumbar vertebræ. Its *openings* are: (1) The aortic, transmitting the aorta, vena azygos major, and the thoracic duct; (2) the esophageal, transmitting the esophagus, pneumogastric nerves, and some small esophageal arteries; (3) the opening for the vena cava, transmitting the inferior vena cava, and small branches of the right phrenic nerve; (4) the right crural, transmitting the right splanchnic nerves; (5) the left crural, transmitting the left splanchnic nerves and the vena azygos minor.—*Nerve Supply:* Phrenic, lower intercostals, and sympathetic.

5. *Subclavian artery* arises on the right side from the innominate artery, on the left from the arch of the aorta; and it passes outward, arching over the pleura, lying on the first rib, betwen the scalenus anticus and medius, and ends at the lower border of the first rib. It is divided into three parts by the scalenus anticus; the first part being from the origin of the artery to the inner border of the scalenus anticus; the second part, posterior to that muscle; and the third part from the outer edge of the muscle to the lower border of the first rib.

6. *Pneumogastric nerve. Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Distribution* is shown by the names of the branches: Meningeal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary, esophageal, and gastric.

7. The *blood supply of the liver:* Hepatic artery and hepatic veins; the portal vein also conveys blood to the liver.

8. The *gall-bladder* is situated in a fossa on the under surface of the right lobe of the liver. It is in relation, in front, with the anterior abdominal wall, immediately below the ninth costal cartilage.

Relations of vermiform appendix. Owing to the variable position of the appendix, these are not definite. As a rule, the appendix is given off from the lower, posterior surface of the cecum, and points upward and to the left, but it may hang down into the pelvic cavity, or take almost any other position with reference to the lower end of the cecum. The point at which the appendix joins the cecum is generally indicated on the anterior abdominal wall by *McBurney's point.* (A line is drawn from the anterior superior spine of the ilium to the umbilicus, and a point is marked off on this line at a distance of two and a half inches from the spine of the ilium.)

9. "The *sympathetic nervous system consists of* (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers."

10. The *inguinal canal* is an oblique canal situated a little above and running parallel with Poupart's ligament. It is from an inch and a half to two inches in length, runs downward and inward, and extends from the internal abdominal ring to the external abdominal ring.

Its *boundaries are: In front:* the skin, superficial fascia, aponeurosis of the external oblique, and (for its outer third) the internal oblique. *Behind:* the conjoined tendon, the triangular fascia, the transversalis fascia, subperitoneal fat, and peritoneum. *Above:* the fibers of the internal oblique and transversalis. *Below:* Poupart's ligament and the transversalis fascia.

Contents: the spermatic cord in the male, and the round ligament in the female.

PHYSIOLOGY.

1. *Physiology* is that branch of science which treats of the functions of living tissues and organisms in a state of health.

2. The *elementary tissues* are: Epithelial, connective, muscular, and nerve tissues.

3. *Varieties of muscle tissue:* (1) Voluntary striated muscle; (2) involuntary, non-striated muscle; (3) involuntary striated or cardiac muscle.

4. The *physical properties of blood:* Fluid, somewhat viscid, red; specific gravity, from 1055 to 1062; alkaline reaction; saltish taste; characteristic odor; variable temperature (average, about 100° F.).

The *constituents of the blood* are plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts). The *white corpuscles* consist of water and solids (proteid, leuconuclein, lecithin, histon, etc.)

The *red blood corpuscles* are biconcave discs, about 1-3200 of an inch in diameter; they are non-nucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the removal of the pressure. Their color is yellowish. They contain hemoglobin.

Their *function* is to carry oxygen from the lungs to the tissues.

The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain: it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their functions are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

There are also *platelets*, which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. Their function is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about 200,000 to more than 500,000 in each cubic millimeter of blood.

Plasma conveys nutriment to the tissues; it holds in

solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

5. *Internal secretions:* It is generally held now that the glandular organs, chiefly the pancreas, liver, and the ductless glands, produce a secretion, peculiar in each case to the particular gland producing it, and which is supposed to be given off to the blood or lymph, and to have some peculiar value in the general metabolism of the body. Such secretions are called internal secretions, in contradistinction to the previously known secretions, which are carried off by a duct, and are known as external secretions. Very little is definitely known of these internal secretions, but much work is being done on the subject.

Internal secretions are produced by the liver, pancreas, ovaries, testes, thyroids, parathyroids, spleen, suprarenals, pituitary body, and by the fetus.

6. If the pneumogastric nerves were severed the heart would beat more rapidly, as the inhibitory impulses would no longer reach the heart.

7. *Auerbach's plexus* is situated in the walls of the intestine between the circular and longitudinal muscle fibers.

Meissner's plexus is situated in the submucous coat of the intestine.

Their *function* is to cause intestinal peristalsis.

8. The *Malpighian bodies* are found in the cortical portion of the kidneys; their function is to excrete the water, salts and urea which are eliminated in the urine.

Malpighian bodies are also found in the spleen; their function is the formation of lymphocytes.

9. The *organs of elimination* are: (1) The *skin*, which eliminates water and a slight quantity of carbon dioxide, urea, and salts; (2) the *lungs*, which eliminate water, carbon dioxide; (3) the *intestines*, which eliminate the indigestible and unabsorbed substances from the food, with secretions from liver and pancreas; (4) the *kidneys*, which eliminate water, urea, and other nitrogenous matter, and inorganic salts.

10. The *cardioinhibitory* and *cardioaccelerator centers* are situated in the floor of the fourth ventricle.

CHEMISTRY.

1. An *element* is a kind of substance which we cannot, by any known means, split up into any two or more other kinds of substance; as oxygen.

A *compound* is a substance made up of two or more elements, chemically united, in definite proportions; as sulphuric acid.

2. A *deliquescent salt* is one that has a tendency to unite with water which it absorbs from the air, becoming damp, and finally liquid.

An *effloresecent salt* is one which, on exposure to air, loses its water of crystallization and becomes a powder.

3. The *arsenical stain:* (1) Volatilizes readily in an atmosphere of hydrogen, and (2) the escaping gas has the odor of garlic; (3) when heated in a current of oxygen, octahedral crystals are formed; (4) it dissolves promptly in a solution of sodium hypochlorite.

The *antimonial stain:* (1) Requires a much higher temperature for its volatilization, and (2) the escaping gas has not the odor of garlic; (3) when heated in a current of oxygen, an amorphous powder is formed; (4) it is insoluble in a solution of sodium hypochlorite.

4. Chlorine gas may be made by heating together manganese dioxide and hydrochloric acid:

$$MnO_2 + 4\,HCl = MnCl_2 + 2\,H_2O + Cl_2$$

Chlorine gas is a greenish yellow gas, with a penetrating and very irritating odor; in the presence of moisture it is a bleaching agent; it combines readily with other elements, and frequently combines with the evolution of light and heat; it is a disinfectant. Its value lies in its bleaching and disinfecting properties.

5. An *acid* is a compound of an electronegative element or residue with hydrogen, part or all of which hydrogen it can part with in exchange for an electropositive element, without the formation of a base.

A *base* is a ternary compound which is capable of entering into double decomposition with an acid, to form a salt and water.

$$2\,NaCl + H_2SO_4 = Na_2SO_4 + 2\,HCl$$

6. A *normal salt* is one in which all the replaceable hydrogen of the acid has been replaced.

A *basic salt* is a compound made up of a normal salt and the hydroxide or oxide of a metal.

An *acid salt* is one in which only a part of the replaceable hydrogen of the acid has been replaced.

7. *Iodine* is a bluish-gray solid, in crystalline scales, with a metallic luster; it is volatile, and has a peculiar odor; it is very slightly soluble in water.

Free iodine colors starch paste a dark violet-blue.

8. *Chloral hydrate* is prepared by mixing together equivalent parts of chloral and water.

It is a colorless, transparent, crystalline solid, with a penetrating and aromatic odor, and a caustic taste;

it slowly volatilizes when exposed to the air, and is freely soluble.

9. *Salicylic acid* is obtained synthetically from phenol; it exists naturally, in combination, in oil of wintergreen.

10. Solution of neutral ferric chloride gives a blue color with morphine.

HISTOLOGY.

1. *The Membranes of the Brain.*—"The *Dura* is a tough membrane composed of interlacing bundles of white fibrous and yellow elastic tissues that contain lymph spaces between them. Within the skull, it forms the inner periosteum of the cranium, which relation ceases at the foramen magnum, the entrance into the vertebral canal. This membrane is lined by endothelial cells, and forms the outer boundary of the subdural lymph space. It is quite vascular, and a few nerves, that pass to the blood spaces are found. The *Arachnoid* is a thin, delicate, weblike membrane composed of loosely interwoven bundles of white fibrous tissue. It lies closely applied to the dura, and is separated from the pia by the subarachnoidean lymph space. This is also lined by endothelial cells. It forms the Pacchionian bodies and villi, but contains neither blood vessels nor nerves. The *Pia* is the vascular membrane. Its outer portion contains the bulk of the vessels, while the inner enters into close relation with the nerve tissue. Its blood vessels lie in the fibro-elastic network, surrounded by perivascular lymphatics. Its arachnoidean surface is covered by endothelial cells. Only a few nerve fibers are present. The pia is the only one of these membranes that follows the fissures and depressions of the nerve system."—(Radasch's *Histology.*)

2. "The *skin* is composed of two parts, the epidermis and cutis vera. The *Epidermis* consists of stratified squamous epithelium, the cutis vera of fibrous tissue. Processes of these interdigitate. The deeper layers of the epidermis are soft, and constitute the rete mucosum, or stratum Malpighii. The cells of the deepest layer are columnar in shape, and in dark races they contain pigment. In the layers above the cells become polygonal or rounded. Narrow clefts between the cells are bridged by fine protoplasmic processes (prickle cells). The superficial layers are horny. In the layers of cells (stratum granulosum) next the stratum Malpighii granules of a substance called "eleidin" accumulate. In the layers superficial to this (stratum lucidum) the cells contain large droplets of a similar substance (kerato-hyalin), which tend to run together and obscure

the characters of the cells and render their outline indistinct, giving the layers a clear appearance. The surface layers take the form of long, thin, flat cells, whose nuclei have been obscured by kerato-hyalin. These constitute the stratum corneum. Cells of the surface layer are always being lost, and are replenished from the cells of the deeper layers. The young cells formed in the deep layers push the older cells toward the surface, and as they pass outward the cells begin to accumulate granules, and then become transformed to the type found in the stratum corneum. The *Cutis Vera* is composed of dense fibrous tissue, which rises up into papillæ, indenting the epithelium. In the deeper part the fibrous tissue becomes looser, and merges indefinitely into the reticular tissue of the subcutaneous layer. In the papillæ are loops of capillary vessels, and in the palm and sole there are tactile corpuscles. Bloodvessels form a capillary network near the surface of the true skin, and send up loops into the papillæ and supply branches to the hairs, sweat glands, etc.; but vessels do not pass into the epidermis. Nerves pass into the Malpighian layer, and some of the varicose branches form flattened menisci between the layer of cells. Medullated nerves end in touch-corpuscles in the fibrous papillæ."—(*Aids to Histology.*)

3. *Peyer's patches* are aggregations of solitary glands, measuring from about half an inch to three inches in length; they are found mainly in the ileum, but also occur in the duodenum, and jejunum; they are situated lengthwise in the intestine, and are located opposite to the mesenteric attachment. Each patch is surrounded by a group of the crypts of Lieberkühn. There are said to be from 30 to 50 of these patches in the human intestine. As a rule, they have no villi on their surface.

4. The thyroid gland "is surrounded by a capsule that sends in trabeculæ, which divide the gland into lobes and lobules. These divisions are irregular, and the lobules are composed of a number of short tubules, sometimes called follicles. Each tubule is lined by cuboidal epithelial cells that rest upon a basement membrane; outside of this is the intralobular, or intertubular, connective tissue that supports the blood-vessels. In the tubules is seen a peculiar, homogeneous substance, the colloid substance, that is supposedly the result of the activity of the cells. It has a yellowish color, and as blood cells are frequently seen in it, the

color may be due to the hemoglobin from these."—(Radasch's *Compend of Histology.*)

5. "The chief difference between the pyloric and cardiac regions of the stomach is found in the mucosa. (1) The crypts in the cardiac end are shallow, while in the pyloric end the crypts frequently extend half way through the thickness of the mucosa. (2) The gastric glands are longer than the crypts in the cardiac end; toward the pyloric end the glands become shorter, tortuous, and pressed closely against the muscularis mucosa. Many of the pyloric glands are branched. (3) The parietal cells are numerous in the cardiac region and practically absent in the pyloric. The pyloric mucosa, in this way, comes to resemble that of the small intestine. In addition, an occasional villus or Brunner's gland may be found in the pyloric end."—(Hill's *Histology.*)

6. *Development of Bone.*—"The development of bone is either intramembranous or endochondral. In the latter a cartilage stage intervenes, otherwise the history in each case is the same. A synopsis of endochondral development is as follows: (1) A solid shaft of hyaline cartilage, non-vascular and without any marrow cavity. (2) In the center of this shaft the cartilage cells enlarge, their lacunæ enlarge and coalesce, particularly along lines extending toward the ends of the bone. The rosette produced by this excavation is called the primary areola of Sharpey. (3) Lime salts are deposited in the thin walls of these spaces, making calcified cartilage. (4) Osteogenetic cells and blood vessels from the periosteum enter the cartilage spaces. The cartilage cells disappear with this invasion and the excavation, begun by the cartilage cells, is further enlarged by the bone cells. The excavated areas are now called the secondary areolæ of Sharpey, the cavities having a rich blood supply quite in contrast with the primary areolæ. The marrow cavity is excavated and the shaft becomes longitudinally porous. Endochondral bone, therefore, develops *in* cartilage, not *from* cartilage. (5) Osteogenetic cells attach themselves to the wall of these enlarged Haversian canals and become enclosed in lime deposits, forming thus the outer lamellæ and outer row of bone cells of each Haversian system. Cells with lamellæ are added centripetally to this outer row and thus ultimately complete the Haversian system, leaving a small central canal containing vessels and a nerve. Ossification begins in the center of the cartilage shaft and proceeds gradually toward each end, so that all the above changes

occur at one and the same time. After birth these changes go on at the ends of the bone, so long as it keeps growing. During this period the bone is made thicker by deposits from the periosteum forming the circumferential lamellæ of bony shafts. These lamellæ are added without the intervention of a cartilage stage and therefore represent intramembranous development."—(Hill's *Histology.*)

7. A cross section of the spinal cord at the tenth dorsal vertebra will show that the outline of the cord is almost circular, with the transverse diameter a little larger than the antero-posterior; the posterior median cleft extends beyond the center of the cord; the gray matter is in considerable quantity, both horns being somewhat thick and approaching the type of the lumbar cord; there is little or none of the formatio reticularis; there is no posterior paramedian groove or septum; and the central canal is nearer to the anterior than to the posterior surface of the cord.

8. Arteries and veins resemble each other, generally, in structure; they both have three coats, with the same general arrangement, but in the veins the walls are thinner in proportion to the size of the lumen of the vessel. Further, in the veins the internal coat has less elastic tissue and the endothelium cells are shorter; the middle coat has less muscle and elastic tissue and more fibrous tissue; many of the veins are provided with valves.

9. *Lymph glands* are small, bean-shaped organs, from a few millimeters to several centimeters in size. Each is surrounded by a capsule, and composed of cortex, medulla, and hilus. The capsule consists of white fibrous tissue and contains some yellow elastic and smooth muscle tissues; beneath is a lymph space exhibiting a network of reticulum and called the sinus. From the inner surface of the capsule, trabeculæ are sent into the cortex, and these divide the latter into a number of masses called secondary nodules. The lymph space continues along the trabeculæ. The cortex contains the secondary nodules and trabeculæ. The former consist of dense lymphoid tissue, and contain a germinal center. The cells are chiefly lymphocytes, which are arranged in concentric layers around the periphery. Other cells of the hyaline variety are found in the central portion. The nodules continue into the center of the node as the medullary cords. The trabeculæ separate the nodules from one another, and pass into the medulla surrounded by the lymph space. The medulla consists of the medullary cords and tra-

beculæ. The cords are the band-like continuations of the secondary follicles, and are separated from the trabeculæ by the lymph spaces that accompany the latter. They consist of dense lymphoid tissue, supported by reticulum. At the hilus, the medulla comes to the surface. The hilus is a scar-like depression at one side, where the vessels enter and leave. At this place, the secondary nodules are wanting, and the medulla comes to the surface."—(Radasch's *Histology.*)

BACTERIOLOGY.

1. "The *Wassermann reaction* for the diagnosis of syphilis.—If the inactivated serum from a suspected luetic is mixed with organ extract (luetic liver or guinea pig heart macerated, extracted with alcohol and inactivated) and complement (fresh guinea pig serum) added, the complement is bound if the antigen finds an homologous antibody in the serum, that is, if the serum is genuinely syphilitic. To determine whether this anchoring of the complement has taken place, the mixture, after standing for a time, is brought in contact with another mixture (of washed sheep's corpuscles and inactivated specific hemolytic serum obtained by injecting a rabbit with sheep corpuscles), which consists of red corpuscles and their specific amboceptor. Should the complement in the first mixture not be anchored, the "hemolytic system" will be complete and hemolysis will occur. The reaction is a complicated one, and it is necessary to control it carefully. A common source of error has been the use of too large a quantity of organ extract, which has the effect of bringing about an anchoring of the complement even in the absence of the specific antibody in the serum. Noguchi has devised a modification of the Wassermann method which is simple and exceedingly delicate."—(Jordan's *Bacteriology.*)

2. *Alexins* are defensive bodies which exist normally in the blood serum.

Agglutinin is something in the blood serum of an animal affected with a bacterial disease which is capable of causing the clumping of the bacteria which cause the disease.

Precipitin is a substance in the immune blood serum which causes precipitation of an albuminous body which has been injected into the body.

3. *Diapedesis* is the passage of the blood or the red corpuscles through the unruptured walls of the blood vessels.

Phagocytsis is the faculty of certain cells (notably

the mononuclear and polynuclear leucocytes) to take up and destroy bacteria. Hence it is a protective process, and has been claimed to be an essential process in immunity.

4. *Staphylococcus* is stained with aqueous solutions of the anilin dyes, and also by Gram's method.

Streptococcus is stained with aqueous solutions of the anilin dyes, and also by Gram's method.

Negri bodies are stained by methyelene blue and eosin, also by Giemsa's method.

5. The diphtheria bacillus grows readily upon all the ordinary media, and is very easy to obtain in pure culture, plates not being necessary. Material from the infected throat can be taken with a swab or platinum loop and spread upon the surface of several successive tubes of Loeffler's blood serum media (which consists of three parts of blood serum with one part of ordinary bouillon to which has been added one per cent. of glucose).

6. *Toxins* are poisonous products of bacteria or of ptomaines or leucomaines.

Endotoxins are toxins which are not secreted into the culture medium by the bacteria, but are rather attached to the bodies of the bacteria.

Autotoxins are toxins which originate within the body upon which they act.

7. The *pneumococcus* (of Friedlander) is an encapsulated bacillus of variable length, non-motile, non-flagellated, aerobic and optionally anaerobic, non-liquefying, and pathogenic; it stains with the ordinary anilin dyes, but does not retain the color when stained by Gram's method. Its form is so variable that it has been described by different writers as a coccus or a bacterium.

The *parasite of tertian malarial fever* is about one and a half times the diameter of a red corpuscle, and is mulberry shaped; by the process of segmentation, from 12 to 24 young parasites are formed; the male gametocyte is smaller than the female gametocyte; there are no crescents.

8. The *Widal test for typhoid fever* "depends upon the fact that serum from the blood of one ill with typhoid fever, mixed with a recent culture, will cause the typhoid bacilli to lose their motility and gather in groups, the whole called 'clumping.' Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and

transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile coverglass, and this is inverted over a sterile hollow-ground slide and examined. . . .A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid movement inside of twenty minutes." (From Thayer's *Pathology*.)

Von Pirquet's method of cutaneous diagnosis of tuberculosis.—"Two small drops of old tuberculin are placed on the skin of the front of the forearm, about 2 inches apart, and the skin is slightly scarified, first at a point midway between them, and then through each of the drops. A convenient scarifier is a piece of heavy platinum wire, the end of which is hammered to a chisel edge. This is held at right angles to the skin, and rotated six to twelve times with just sufficient pressure to remove the epidermis without drawing blood. In about ten minutes the excess of tuberculin is gently wiped away with cotton. No bandage is necessary. A positive reaction is shown by the appearance in twenty-four to forty-eight hours of a papule with red areola, which contrasts markedly with the small red spot left by the control scarification."—(Todd's *Clinical Diagnosis*.)

9. The *Staphylococcus pyogenes aureus* and the *Streptococcus pyogenes* are the pus-producing organisms which cause the greatest mortality. The *Staphylococcus pyogenes aureus* may be found in boils, carbuncles, abscesses, endocarditis, various skin lesions, diseases of lungs, spleen, and kidneys, osteomyelitis. The *Streptococcus pyogenes* may be found in erysipelas, endocarditis, meningitis, periostitis, otitis, emphysema, pneumonia, lymphangitis, sepsis, puerperal endometritis, scarlet fever.

10. *Flagellated bacteria* are bacteria which have flagella or long filaments or hair-like structures, which are undulating and may cause the motility of the bacteria to which they are attached. *Flagellated pathogenic organisms: Bacillus pyocyaneus, Bacillus tetani, Spirillum choleræ Asiaticæ, Bacillus typhosus, Bacillus coli communis, Bacillus enteritidis, Bacillus dysenteriæ, Bacillus icteroides, Bacillus œdematis maligni, Bacillus anthracis symptomatici.*

OBSTETRICS.

1. *Puerperal septicemia* is septic intoxication with the presence of living pyogenic bacteria in the blood occurring during the puerperium. *Symptoms:* Chill; rapid rise in temperature, to about 103° or 104°, higher in the evening than in the morning; sweats; rapid pulse; depression; dry tongue; anorexia; carphologia; scanty, high-colored, albuminous urine; restlessness; sometimes delirium or coma. The uterus is large, and tender; the lochia are diminished or suppressed; the milk secretion is often suppressed; pain in the abdomen; peritonitis may develop. *Treatment:* Prophylaxis is of the greatest importance. Purgatives; vaginal douches; some recommend curettage, others decry it; the introduction of antiseptics into the uterus; supportive and general treatment are indicated; specific sera and vaccines have been recommended by some.

2. The uterus is supplied by the uterine and ovarian arteries; the veins correspond to the arteries.

3. *Changes that take place in the circulatory apparatus at birth:* The hypogastric arteries dwindle and become impervious; the Eustachian valve atrophies; the foramen ovale closes; the ductus arteriosus and ductus venosus become obliterated; the umbilical vein becomes obliterated and is afterward known as the round ligament of the liver.

4. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroma: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

5. *Indications for the use of forceps* are: (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior, (*b*) mento-anterior face, (*c*) breech arrested in cavity. B. Evi-

dence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage; prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both (Jewett). *Conditions necessary for the use of forceps* are: (1) The rectum and bladder must be empty; (2) the os uteri must be fully dilated; (3) the membranes must be ruptured; (4) the pelvis must be of sufficient size.

Cesarean section (conservative). *"Indications:* The cases in which it is performed are: (1) Extreme deformity of the pelvis, in which delivery by forceps and version is excluded, and in which craniotomy is either impossible or would be more dangerous to the mother than cutting into the abdomen and uterus; and in which there is not room for a successful symphyseotomy. Such cases present the *'positive'* indication for cesarean section; there is nothing else to be done. Flat pelves having a conjugata vera of 2¼ inches or less, and justo-minor pelves with a conjugata vera of 2½ inches or less, present this positive indication; (2) cases of more moderate pelvic contraction in which craniotomy is possible, but cesarean section is agreed upon to *save the life of the child;* (3) mechanical obstruction in the pelvis from fibroid, cancerous, bony, or other tumors which cannot be pushed up out of the way or be safely removed; (4) irreducible impaction of a *living* child in transverse presentations; (5) in women dying near the end of pregnancy the child, if alive, is rapidly delivered by *post-mortem* cesarean section; (6) various other obstructions from inflammatory adhesions, atresia, constrictions, etc., of the vagina, and uterine displacements, may rarely require the operation; (7) recently the operation has been done in eclampsia cases, where more conservative methods of rapid delivery were impracticable; and (8) in placenta prævia, chiefly with a view to lessen the infant mortality attending the usual treatment of this complication."—King's *Obstetrics.*)

6. By the *hygiene of pregnancy* is meant the care which should be observed by the pregnant woman for the preservation of health and strength both of herself and of the fetus. The pregnant woman should take moderate exercise in the open air; in the last month massage may take the place of exercise. Daily bathing in tepid water, care of the teeth, regularity of the bowels, ample sleep in a well-ventilated room, plenty (but not too much) of simple, nourishing and easily digested

food, at regular hours, clothing not too tight, especially about the abdomen and breasts; attention to the nipples, regular examination of the urine, and the restriction of marital relations are the main points to which advice should be directed.

7. Three diseases to which pregnancy may predispose: Pernicious vomiting, eclampsia, varicose veins. *Symptoms of eclampsia:* Headache, nausea, and vomiting, epigastric pain, vertigo, ringing in the ears, flashes of light or darkness, double vision, blindness, deafness, mental disturbance, defective memory, somnolence; symptoms easily explained by the circulation of toxic blood through the nerve centers. These may be preceded by lassitude, and accompanied by constipation, or by diarrhea. Headache is perhaps the most significant and common warning symptom. In bad cases the urine is reduced in quantity (almost suppressed), very dark in color, its albumin greatly increased, so that it becomes solid on boiling. Next comes the final catastrophe of convulsions. The convulsive fit begins with twitching of the facial muscles, rolling and fixation of the eyeballs, puckering of the lips, fixation of the jaws, protrusion of the tongue, etc., soon followed by violent spasms of the muscles of the trunk and limbs, including those of respiration; hence lividity of the face and stertorous breathing, biting of the tongue, opisthotonus, etc. The fit lasts fifteen or twenty seconds, ending in partial or complete coma, possibly death; or consciousness may return, to be followed by other convulsions.—(King.)

8. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of a fetus toward the end of pregnancy; (6) hydatiform mole; (7) habitually large fetal head.

Method of performing premature labor: "Catheterization of the uterus: The first step consists in separation of the membranes from the lower uterine segment by means of a uterine sound or with the finger. The operation must be aseptic. Detachment of the membranes with the sound may be done with the woman in either the left lateral or dorsal recumbent position. For the use of the hand the dorsal position is best. The second step consists in the insertion of one or more No. 12 English bougies, or a sterile rectal tube, between the membranes and the uterus. No anesthetic is required. Usually the bougie or rectal tube is most readily passed with the aid of the Sims position, the Sims

speculum exposing the cervix, which is drawn forward and held with a volsella. The bougie is sterilized by boiling or steaming, the proximal end is cut off, and a stylet inserted. To facilitate introduction the bougie is bent to nearly a right angle at about three inches from the distal end, giving it a large curve. Great care must be used to avoid rupturing the membranes. The instrument is then pushed up gently and in the direction in which it passes most easily. After it has entered between the membranes and the uterine wall, the stylet is drawn down about one inch. The flexible tip of the bougie finds its way readily with little risk of perforating the membranes. The bougie fully in place, the stylet is withdrawn. A second bougie may be inserted if it can be pushed into place without too much difficulty. Bleeding is probable evidence that the instrument has passed behind the placenta. The hemorrhage may occasionally be excessive. It is then best to withdraw the instrument and pass it in another direction. A light tampon of gauze may be packed in the vagina, but it is not required to support the bougie. The instrument is left to be expelled with the child. Labor usually is established within twenty-four hours. This method is not suited to cases in which immediate delivery is called for."—(Polak's *Obstetrics.*)

9. OPHTHALMIA NEONATORUM. *Prophylaxis:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth. *Treatment:* Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burnt.

10. *Abortion* is expulsion or delivery of the fetus before it is viable, that is up to about the twenty-eighth week. *Premature labor* is expulsion or delivery of the fetus between the twenty-eighth week and term.

GYNECOLOGY.

1. A complete gynecological examination would include (1) anamnesis, including family history; personal history, with special reference to menstruation, labors, and miscarriages, and present illness. (2) Examination of the abdomen (and breasts), including inspec-

tion, palpation, percussion, auscultation, and mensuration. (3) Inspection of the external genitals. (4) Vaginal examination, digital, bimanual, and with speculum. (5) Bimanual examination of uterus and appendages. (6) Sometimes the sound, or curette, may be required. (7) Chemical and microscopical examination of the urine. (8) Microscopical examination of discharges or uterine scrapings. (9) Rectal examination. (10) Cystoscopic examination and perhaps ureteral catheterization. (11) In case of phantom tumor or pseudocyesis, anesthetization would be required.

2. *Pfannenstiel's incision* avoids a median incision, the transverse scar is partly hidden by the pubic hair, hernia is said to be less liable to follow. The disadvantage is that it is only available for *limited* operations on the tubes, ovaries, uterus, bladder, and pelvic cavity.

METRORRHAGIA: *Causes:* Salpingitis, ovaritis, ovarian tumors, endometritis, endocervicitis, metritis; fibroids, sarcoma, carcinoma or polyps of uterus; prolapsed, retroflexed, or retroverted uterus; subinvolution; and general diseases (such as scorbutus, purpura, hemophilia, acute fevers, nephritis, hepatic cirrhosis).

3. *Perineorrhapy:* "The labia are seized with Allis' forceps at the level of the lowest carunculæ myrtiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis forceps and the guide stitch in opposite directions outward and downward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double tier suture of chromic gut, two half hitches being taken in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transversus perinei and bulbocavernosus muscles are brought together by silk-worm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal stitches are knotted; they are removed on the twelfth day."—(Hirst's *Obstetrics.*)

4. *Vaginal examination of a virgin* should not be undertaken unless absolutely necessary, an anesthetic should be employed if possible, and only one finger should be used.

5. Ectopic gestation, and ovarian cyst, with twisted pedicle.

6. *Ventrofixation and ventrosuspension:* Hermann (*Students' Handbook of Gynecology*) states objections to this operation as follows: "(1) Its risk. Oversights will occur in the practice even of the most careful; but the risk is very small. (2) Adhesions within the peritoneum are sometimes absorbed. They are absorbed often enough to make stitching of peritoneum to peritoneum unsatisfactory. After abdominal section ventral hernia may first develop after the scar has held firm for twelve years; and possibly the new attachment of the uterus may also, after many years, give way. (3) The operation lifts up the uterus. If the vulval orifice is very large there may still be a protrusion of the vaginal mucous membrane. It is well, therefore, to precede ventral fixation in women past child bearing by posterior colporrhapy. (4) It is said to cause difficulty in labor, should the patient become pregnant. It does not always do so; and in many cases reported as illustrating such difficulty, the ventral fixation was not the cause of the difficulty. Ventral fixation after colporrhaphy, if the result be permanent, relieves the patient of any necessity for the continual readjustment of a pessary, and lifts the uterus up effectually. Ventral fixation is not advised in cases in which the womb can be comfortably kept up by a pessary."

7. "The *indications for oophorectomy* are chiefly infections of the ovaries; inflammations and their consequences; certain rare and otherwise incurable cases of dysmenorrhea; certain otherwise incurable cases of ovarian pain, independent of the periods, and making the patient an incurable invalid; clear cases of menstrual epilepsy; menstrual insanity, when the attacks occur only during the menstrual week, the patient being free from them during the interval; osteomalacia; and bleeding uterine fibromata, of small size, where the patient declines hysterectomy and other means fail."—(Reed's *Gynecology.*)

8. The perineum should be repaired; and colporrhapy (anterior and posterior) be done for the cystocele and rectocele; ventrosuspension or ventrofixation may be done for the procidentia, though this last procedure is not as imperative in the case of a woman of 50

years of age as it would be in a much younger woman.

9. *Contraindications to uterine curettage:* The least suspicion of even the possibility of pregnancy; menstruation; acute endometritis; malignant disease of the uterus or vagina; acute pelvic inflammation.

10. If there is nothing the matter with the appendix, there can be no necessity for its removal; but some surgeons believe that in case of any abdominal operation it is well to remove the appendix *in order that it may not cause trouble later on.* It may be well, before an abdominal operation, to consult the wishes of the patient as to the removal of a healthy organ.

PATHOLOGY.

1. A *tumor* is a pathological new growth which tends to persist independently of the structures in which it lies, and which performs no physiological function. *Tumors may be classified as follows:*

I. Those derived from the mesoblast:
   (*a*) *Benign:* Lipoma (from fat tissue), fibroma (from fibrous tissue), chondroma (from cartilage), osteoma (from bone), myoma (from muscle), neuroma (from nerve tissue), glioma (from neuroglia), angioma (from vessels).
   (*b*) *Malignant:* Sarcoma (from connective tissues).

II. Those derived from the epiblast or hypoblast:
   (*a*) *Benign:* Adenoma (from gland tissue), papilloma (from papillæ of skin or mucous membrane).
   (*b*) *Malignant:* Carcinoma (from epithelial tissues).

2. *Malignant tumors* are not encapsulated, tend to infiltrate the surrounding tissues, give rise to metastatic growths, have a tendency to recur after removal, give a cachexia, have a fatal tendency.

Metastases are carried by the lymphatics and by the blood vessels.

3. The phenomena of inflammation are dilatation of the arterioles, capillaries, and small veins. At first the blood current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small veins, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin, or to act as food for connective tissue cells, or to act as a phagocyte and be transformed into a pus corpuscle. Red corpuscles

may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the plasma and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin.

The tissues are thus invaded with numbers of leucocytes. In bacterial inflammation a varying portion of the tissues is killed by the toxins produced, and is either replaced by a mass of small round cells, or liquefied into pus. In the latter case it is surrounded by a ring of small round cells. The connective tissue cells absorb the leucocytes, and new vessels are formed, thus constituting repair. In nonbacterial inflammation, exudation may separate layers of cells to a large extent and form blebs. In chronic inflammation the formation of new fibrous tissue is the chief part of the process.—(From *Aids to Surgery.*)

4. *Pathological processes leading to destruction of valve in mitral insufficiency:* "In those cases not directly attributable to acute endocarditis, the changes briefly are: (1) Formation of small nodular prominences, with thickening of the valve. (2) Formation of yellowish, opaque, fatty patches. (3) Great increase of fibrous tissue, which subsequently contracts, producing much deformity. The cusps become rigid, curled, and may cause great obstruction to the onward flow of blood, and at the same time fail accurately to close together when required. (4) Great narrowing of the valvular orifice. (5) Shortening of the chordæ tendineæ and papillary muscles. Frequently fusion of the chordæ tendineæ (adhesions). (6) Calcification of the fibrosed portion."—(Wheeler & Jack's *Handbook of Medicine.*)

5. In *pernicious anemia* the blood would show: (1) A diminution in the number of red corpuscles; (2) a relative increase in the amount of hemoglobin; (3) poikilocytosis; (4) the presence of nucleated red cells; (5) variation in the size of the red cells; (6) the leucocytes *may be* diminished.

6. The systemic pathological changes usually associated with contracted kidney are: "The left side of the heart is hypertrophied, and there is also hypertrophy of the muscular fiber of the arterioles throughout the body; if the case is protracted, the hypertrophied tissues undergo fatty degeneration. Cardiac degeneration with arteriocapillary sclerosis or fibrosis is associated with advanced nephritis. The changes in the arterial walls lead to apoplexy, albuminuric retinitis, and fatty degeneration and atrophy of the

OBSTETRICS.

1. *Puerperal septicemia* is septic intoxication with the presence of living pyogenic bacteria in the blood occurring during the puerperium. *Symptoms:* Chill; rapid rise in temperature, to about 103° or 104°, higher in the evening than in the morning; sweats; rapid pulse; depression; dry tongue; anorexia; carphologia; scanty, high-colored, albuminous urine; restlessness; sometimes delirium or coma. The uterus is large, and tender; the lochia are diminished or suppressed; the milk secretion is often suppressed; pain in the abdomen; peritonitis may develop. *Treatment:* Prophylaxis is of the greatest importance. Purgatives; vaginal douches; some recommend curettage, others decry it; the introduction of antiseptics into the uterus; supportive and general treatment are indicated; specific sera and vaccines have been recommended by some.

2. The uterus is supplied by the uterine and ovarian arteries; the veins correspond to the arteries.

3. *Changes that take place in the circulatory apparatus at birth:* The hypogastric arteries dwindle and become impervious; the Eustachian valve atrophies; the foramen ovale closes; the ductus arteriosus and ductus venosus become obliterated; the umbilical vein becomes obliterated and is afterward known as the round ligament of the liver.

4. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroma: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

5. *Indications for the use of forceps* are: (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior, (*b*) mento-anterior face, (*c*) breech arrested in cavity. B. Evi-

dence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage; prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both (Jewett). *Conditions necessary for the use of forceps* are: (1) The rectum and bladder must be empty; (2) the os uteri must be fully dilated; (3) the membranes must be ruptured; (4) the pelvis must be of sufficient size.

Cesarean section (conservative). "*Indications:* The cases in which it is performed are: (1) Extreme deformity of the pelvis, in which delivery by forceps and version is excluded, and in which craniotomy is either impossible or would be more dangerous to the mother than cutting into the abdomen and uterus; and in which there is not room for a successful symphyseotomy. Such cases present the '*positive*' indication for cesarean section; there is nothing else to be done. Flat pelves having a conjugata vera of 2¼ inches or less, and justo-minor pelves with a conjugata vera of 2½ inches or less, present this positive indication; (2) cases of more moderate pelvic contraction in which craniotomy is possible, but cesarean section is agreed upon to *save the life of the child;* (3) mechanical obstruction in the pelvis from fibroid, cancerous, bony, or other tumors which cannot be pushed up out of the way or be safely removed; (4) irreducible impaction of a *living* child in transverse presentations; (5) in women dying near the end of pregnancy the child, if alive, is rapidly delivered by *post-mortem* cesarean section; (6) various other obstructions from inflammatory adhesions, atresia, constrictions, etc., of the vagina, and uterine displacements, may rarely require the operation; (7) recently the operation has been done in eclampsia cases, where more conservative methods of rapid delivery were impracticable; and (8) in placenta prævia, chiefly with a view to lessen the infant mortality attending the usual treatment of this complication."—King's *Obstetrics.*)

6. By the *hygiene of pregnancy* is meant the care which should be observed by the pregnant woman for the preservation of health and strength both of herself and of the fetus. The pregnant woman should take moderate exercise in the open air; in the last month massage may take the place of exercise. Daily bathing in tepid water, care of the teeth, regularity of the bowels, ample sleep in a well-ventilated room, plenty (but not too much) of simple, nourishing and easily digested

enables one to study the condition of the heart and lungs.

2. *Pott's disease of the spine may be diagnosed* by: The local pain or ache at the site of the disease; it is made worse by jarring, or pressure on the head; girdle-pain or stomach-ache may be present; muscular rigidity; angular displacement at the site of the disease; abscess; and, sometimes, paraplegia.

3. The use of the *sphygmomanometer* is to estimate the blood pressure of a patient. *Blood pressure* is the pressure exerted by the blood against the wall of the vessel in which it is contained.

4. *Hypertension* may be observed in: Chronic interstitial nephritis, arteriosclerosis, uremia, gout, lead poisoning, cerebral hemorrhage.

Hypotension may be observed in: Shock, collapse, concealed hemorrhage, anemia, acute infectious diseases.

5. (1) *Frequent pulse:* In fevers, exophthalmic goiter, early phthisis, heart disease, anemia, chlorosis, locomotor ataxia, abuse of alcohol, tea, coffee. (2) *Slow pulse:* In cardiac disease, cerebral tumor or hemorrhage, meningitis, myxedema, epilepsy, some poisons, digestive disorders. (3) *Intermittent pulse:* In cardiac disease, fevers, poisons, neurasthenia, cerebral troubles, digestive disturbances. (4) *High tension pulse:* In arteriosclerosis, gout, diabetes, contracted kidney. (5) *Low tension pulse:* In fevers, anemia.

6. *Organic murmurs* are due to stenosis or incompetency of one or more of the valves of the heart.

Functional murmurs are not due to valvular disease.

Organic murmurs may be systolic or diastolic; may be accompanied by marked dilatation or hypertrophy, and there will probably be a history of rheumatism or of some other disease capable of producing endocarditis. Whereas a murmur, usually systolic, soft, and blowing, heard best over the pulmonic area, associated with evidences of chlorosis or anemia, and affected by the position of the patient, is a *hemic* or *functional* murmur, and denotes as a rule an impoverished condition of the blood.

7. *Normal percussion notes:* "The apices yield normally a resonant note, clear but not intense and tending to rise in pitch (dullness) as the pleximeter finger approaches the vertebral line posteriorly, or the trachea, anteriorly. The infraclavicular space is typically resonant, and the pitch of the percussion note is slightly higher upon the right than upon the left side. Any tendency to approach the region of a

primary bronchus results in a note of heightened pitch, increased resistance, and shortened duration (dullness). Below the right second rib anteriorly there is increased resonance until the fifth rib is reached, when the pitch rises because of the underlying solid tissue of the liver. At the sixth rib resonance ceases and a line of absolute dullness marks the lower limit of the lung and the upper border of the uncovered surface of the liver. In the axillary region typical pulmonary resonance persists until the eighth rib is reached. The cardiac area markedly modifies the percussion note of the left chest anteriorly from the lower border of the third rib downward within the nipple line; anteriorly along the whole internal boundary of the lung the note rises as one approaches the sternum."—(Greene's *Medical Diagnosis.*)

8. The microscope may be employed as an aid to diagnosis in: Typhoid fever, malaria, cholera, tuberculosis, amebic dysentery, diphtheria, anemia, chlorosis, leukemia, various forms of intestinal parasites, gonorrhea, influenza, tetanus, asthma, pneumonia, trichinosis, anthrax, actinomycosis, Bright's disease, syphilis.

9. *Symptoms of sciatica:* "Onset usually sudden, with pain in the back of the thigh, running down the course of the nerve. It may extend up into the lumbar region, but is most marked in the thigh. Motion increases it, and consequently the pelvis tilts up toward the sound side and the trunk leans over toward the affected side (sciatic scoliosis). The pain is dull and almost continuous, with paroxysms in which it is sharp, lancinating, burning, and of great severity. There may be sensations of tingling, numbness, and a sense of weight and coldness in the affected limb. There are tender points at the sciatic notch, the middle of the hip, behind the knee, in the middle of the calf, behind the external malleolus, and on the back of the foot. Rarely there is anesthesia along the course of the nerve. There may be weakness and muscular atrophy in chronic cases, and occasionally a partial De R. The duration of the disease is usually 2 or 3 months, although it may last for a year or more."—(Butler's *Diagnostics of Internal Medicine.*)

10. In *pellagra* "the symptoms develop insidiously, the earliest manifestations usually being gastro-intestinal—anorexia, stomatitis, salivation, epigastric pain or distress, diarrhea, and a gradually increasing anemia, disinclination to exertion, and psychic depression. The fully developed disease is characterized by cutaneous, *digestive*, and nervous symptoms. There is

at first a characteristic pellagrous erythema that usually comes on first in the spring, tends to subside and recur (in the fall and spring). It develops bilaterally especially on the exposed surfaces, the hands, arms, face, and neck; that is, it seems to be related to the action of the actinic rays of the sun; it may be dry (usually early) or wet; the lesions become pigmented (liver yellow or chocolate color) and usually progress to desquamation, exfoliation, and gangrene of the skin, which are followed by cicatrization. The characteristic digestive symptoms consist of stomatitis, the cardinal red tongue, the bald tongue, or the stippled, bluish black tongue; salivation, pyrosis, and diarrhea (fetid, slimy, greenish stools), sometimes bloody stools, may occur. The nervous symptoms consist of neuromuscular pains in the back and legs, spinal tenderness, headache, vertigo, unilateral or bilateral mydriasis, muscular spasms, exaggerated reflexes, later paralysis with lessened or absent reflexes, mental depression, delusions, hallucinations, melancholia, and insanity. Mild cases may be afebrile, but fever (102° to 105° or more) is not uncommon. Improvement may occur after the lapse of several months, but recurrences especially in the fall and spring are common."—(Kelly's *Practice of Medicine.*)

SURGERY.

1. "A *carbuncle* is a localized inflammation of the subcutaneous tissue, which goes on to sloughing, and is of a more extensive character than a boil. Staphylococci are the common exciting cause, while the predisposing causes are lowered vitality from diabetes, albuminuria, or after infective fevers. Inoculation is by autoinfection or directly from the surface. *Signs:* The disease begins as an infiltration of a patch of subcutaneous tissue, which is hard, painful, and tender, and the skin over it is red and hot. The infiltration may extend till it is the size of a dinner-plate, and the inflammation ends in sloughing and suppuration, not only of the subcutaneous tissues, but of small areas of the skin over it, so that openings develop in the skin, and allow of the exit of pus and sloughs. The openings extend, the sloughs separate, and the wound heals by granulation. The back is a common situation. Sometimes the face is affected, and there is then a danger of thrombosis extending to the cavernous sinus and producing pyemia."—(*Aids to Surgery.*)

An *abscess* is a localized collection of pus in a cavity of new formation. It is, therefore, walled off; if near the surface it fluctuates; it may occur at any period

of life, whereas the carbuncle commonly occurs after forty years of age; the abscess may be caused by staphylococci, streptococci, or any other pus-producing organism; abscess does not cause the severe constitutional symptoms which may be observed in carbuncle.

2. *Preparation of patient for abdominal section.*—"If possible, the patient should be under observation for at least 24 hours prior to the operation. During this time a careful study is made of the urine and the condition of the heart and lungs, and necessary treatment instituted. The diet should be restricted, and a purgative given the night before, followed by an enema on the morning of the operation. No breakfast, or merely a cup of beef-tea, should be given on the day of the op ration. The abdomen should be shaved and scrubbed thoroughly with tincture of green soap and sterile water for at least 10 minutes on the night before the operation. A general bath should then be taken, giving special attention to the inside surfaces of the thighs and to the umbilicus. A soap poultice is applied to the abdomen and allowed to remain for several hours; this is removed, and the abdomen is scrubbed with alcohol and washed with mercuric chloride solution (1:1000). A towel wet with this solution is placed over the abdomen, and a binder is applied.

"If any operation is to be done that will involve opening the vagina—such as total extirpation of uterus—the patient, after being anesthetized, should be placed upon the perineal pad, and the vagina should be thoroughly scrubbed with a piece of gauze held in a dressing forceps, previously dipped in green soap. After the scrubbing the soap should be washed out and the vagina syringed with a 1:2000 sublimate solution. If there is any septic material coming from the uterus, as in cancer of the body, the uterus should be first thoroughly curetted and packed with iodoform gauze. A cancerous cervix should also be curetted, disinfected, and the vagina lightly packed with iodoform gauze.

"All water, basins, trays, aprons, gowns, sheets, sponges, pads, drains, dressings, and everything with which the abdominal wall or the surgeon comes in contact should be carefully sterilized."

After-treatment: "The patient is placed in bed, and care is taken to prevent shock by the application of artificial heat. Nothing but water should be given by the mouth for 24 hours. Pain is relieved by morphine, gr. ¼, hypodermically. Liquid diet is preferred for the first week, at the end of which the stitches are removed. The bowels are opened upon the third day by

fractional doses of calomel, followed in 12 hours by a saline laxative and an enema. The patient should remain in bed for from 2 to 3 weeks."—(*Pocket Cyclopedia.*)

3. *Osteomyelitis* is inflammation of the bone and marrow; the term is often used now for inflammation of bone. The *treatment* consists in relieving the constitutional symptoms and preventing the bone from necrosing. An incision down to the bone is made; if pus is beneath the periosteum, the latter is also incised; a piece of bone is removed by chisel or trephine, pus is removed, the endosteum is hurt as little as possible, the wound is irrigated with hot bichloride solution and packed with gauze; the soft parts are closed and the wound well drained. In case this fails, amputation may be necessary.

Symptoms: Sudden onset; pain, tenderness, fever, chills, swelling of soft parts; sometimes the joint can be moved gently without pain; septicemia or pyemia may be present.

It is to be *diagnosed* from *Rheumatism*, in which more than one joint is affected and the tenderness is *in* the joint, and not *near* it.

4. Treatment of simple fracture at junction of upper with middle third of femur: First of all, prevent the fracture from becoming compound; then reduce it; coapt the edges of the broken bone; immobilize the parts, and attend to the general condition of the patient. Splints and weight extensions may be required.

5. In *ulcer of the duodenum* the symptoms are very similar to those found in ulcer of the stomach; but in the former condition there is less tendency to vomit, the pain does not come on till some time after food has been swallowed (and has had time to pass the pylorus), and blood in the stools is more common. All of these points are due to physiological and anatomical reasons based on the relative position of the stomach and duodenum. A special sign of duodenal ulceration is the so-called "hunger pain" which occurs at the end of digestion, when the unmixed acid of the gastric juice is passing into the duodenum. This pain is relieved by taking food, for when this occurs the pylorus closes, and the gastric juice is for the time retained in the stomach to be mixed with the food, while the alkaline duodenal and pancreatic secretions are stimulated.

6. The surgical complications which may arise in typhoid fever, are: Perforation of the intestine, internal hemorrhage, peritonitis, and cholecystitis.

7. *The diagnostic symptoms of tuberculous kidneys* are: Frequent micturition, with pus, and sometimes blood in the urine; pain and tenderness over the kidneys, enlargement of kidney; chills, fever, and sweats; tubercle bacilli may be found in the urine; the cystoscope will show a retracted ureteral meatus on the affected side; the symptoms are not made worse by movement or improved by rest.

Stone in kidney: Symptoms consist of pain in the loins, markedly increased by exercise, especially on jolting. The pain may be referred to the thigh, groin or testicle. The colic is associated with hematuria, and often pyuria exists with frequency of micturition. The kidney may be enlarged, and tender on pressure. A large stone may exist without any symptom whatever, The most typical symptom consists in a sudden attack of excruciating and paroxysmal pain shooting down the loin to the bladder and testis. The attack is accompanied by vomiting, faintness, and collapse. Frequent efforts to pass urine are made, but only a scanty amount of blood-stained urine is passed. The pain ceases suddenly when the calculus slips back into the pelvis or reaches the bladder.

8. "If possible the patient should be kept at rest for three or four days before the operation, the bowels should be opened daily, and an enema given early on the morning of the operation, so that the rectum may be quite empty. Any bronchitis that may be present should be attended to, or in some cases which do not call urgently for relief, the operation should be delayed until the pulmonary symptoms have abated. In cases of cystitis, the bladder should, if practicable, be washed out once every day with a solution of silver nitrate 1:500, followed by boracic lotion toward the end of the irrigation. If cystitis be absent, lavage is neither necessary nor wise. For cystitis, certain drugs may be given with the object of lessening the alkalinity of the urine, and of making the interior of the bladder less septic."—(Jacobson's *Operations of Surgery.*)

9. *Penetrating wounds of right chest:* The treatment in the absence of serious hemorrhage or the lodgment of a foreign body, is disinfection and suture of the external wound and immobilization of the affected side of the chest. Hemorrhage from the internal mammary or intercostal artery may be controlled by ligation, or by pushing a gauze sac between the ribs and filling the inner end of the sac with gauze so that when drawn upon it will make pressure from within out-

ward. Excepting extensive wounds, bleeding from the lung is rarely fatal, as the bleeding is checked by collapse of the lung. In the absence of external hemorrhage serious loss of blood is diagnosticated by the constitutional signs of acute anemia and a rapidly accumulating hemothorax. Cases of this sort have been treated by the introduction of a drainage tube in order to admit air and favor collapse of the lung, but in the presence of serious symptoms one or more ribs should be resected, and the wounded lung dealt with directly by sutures or gauze packing. Hemothorax of lesser degree, or that form due to hemorrhagic pleurisy or tumors of the lung or pleura, does not require special surgical treatment unless it causes pressure symptoms or becomes infected; in the former case aspiration, and in the latter resection of a rib and drainage would be indicated. Foreign bodies should be removed if easily accessible, and the same rules as to the examination of the vulnerating instrument, the clothing, etc., apply here as elsewhere. If the foreign body is not easily found, it should be allowed to remain, unless it gives rise to subsequent trouble, when it may be definitely localized by the *x*-ray and its removal effected, if such be deemed advisable. With the exception of pneumocele, the complications of injuries to the chest are inflammatory in nature, viz., cellulitis, pleurisy, empyema, pneumonia, abscess or gangrene of the lung, mediastinal abscess, and peri-, myo-, or endocarditis."—(Stewart's *Manual of Surgery.*)

10. "The treatment during the stage of collapse is the application of external heat and the administration of stimulants as in shock. Alcohol, however, should not be given, because of its exciting effect on the brain, and care should be taken not to overstimulate. When reaction has been obtained, the patient should be kept in bed in a quiet room, an ice bag placed on the head, the bowels opened with a purge, and the catheter used if there is retention of urine. The diet should be fluid, and sedatives used if necessary. If unconsciousness is prolonged, a suspicion of greater injury than concussion should always be entertained. After severe concussion the patient should avoid mental exertion for a number of weeks or months."—(Stewart's *Manual of Surgery.*)

MEDICAL JURISPRUDENCE.

1. *Rigor mortis* is the condition of rigidity or contraction into which the muscles of the body pass after death. It begins at a period varying from about fifteen minutes to about six hours. It usually begins in the

muscles of the eye, neck, and jaw; then the muscles of the chest and upper extremity, and last of all those of the abdomen and lower extremity are affected. It passes off in the same order in about twenty-four hours. It is said to be due to the coagulation of the muscle plasma.

Medicolegally, it is a sign of death, and an indication of the length of time that has elapsed since death occurred.

2. The *features of the bony skeleton which characize sex*, are: (1) In the male the bones are, as a rule, stronger, larger and heavier, and the prominences, ridges, and lines are more distinct; (2) the skull in the male looks more mature, and less like that of a child, and the glabella is more prominent; (3) in the female the sternum is shorter, the capacity of the thorax is less, and the upper ribs are more movable; (4) in the female the clavicle is shorter, thinner, smoother, and less curved; (5) in the female the sacrum is relatively wider, less curved, and is directed more obliquely backwards; (6) in the female the pelvis is wider, shallower, has an oval inlet, has a larger subpubic angle, the obturator foramen is triangular (oval, in the male), the tuberosities of the ischia are everted; (7) the inclination of the shafts of the femora from the pelvis to the knee is greater in the female.

3. In a *stab wound inflicted before death*, there will be retraction of the skin and muscles, arterial hemorrhage; the wound will have everted edges; large blood clots may be present; signs of repair or of inflammation may be present.

In a *stab wound inflicted after death*, there will be no retraction of skin or muscles, and no eversion of the edges (unless from putrefaction); the hemorrhage will be venous; blood clots are small; and there are no signs of repair or inflammation.

4. *Points which help to determine whether a gunshot wound was self-inflicted:* The location of the wound; the distance at which the shot was fired; the character of the wound; the burning of clothing, skin or hair; the embedding of grains of gunpowder; the presence or absence of the weapon; the position of the body when the wound was received; and certain surrounding circumstances which may have a bearing on the case.

5. "The occasions in which pregnancy becomes the subject of medico-legal inquiry are the following: (1) A woman may declare herself pregnant with an heir to an estate, for the purpose of defrauding other

heirs at law; (2) for the purpose of extorting money from a seducer or paramour; (3) to stay the infliction of capital punishment until after delivery; (4) the plea of pregnancy may be set up as an excuse for non-attendance at a trial, to awaken sympathy, etc.; (5) an accusation of pregnancy may be made against a single woman, or one living apart from her husband, which may result in an action for damages for slander; (6) accusations of malpractice may be made against a medical man for error in diagnosis of pregnancy, or an attempt to bring on an abortion. On the other hand, pregnancy may be concealed (1) in order to procure abortion or infanticide; (2) in order to avoid disgrace."—(Reese's *Medical Jurisprudence.*)

6. When abortion is undertaken by properly qualified physicians after due consultation with other physicians, and for the purpose of saving the life or health of the mother, it is *justifiable;* under all other circumstances it is *criminal.* The former is a perfectly lawful medical procedure; the latter is illegal.

7. *Insanity* is "that state of disordered mind in which a person loses the power of regulating his actions or conduct according to the ordinary rules of society."—(Taylor.)

"*The best classification for legal purposes*"; (1) Idiocy; (2) imbecility; (3) mania; (4) melancholia; (5) monomania; (6) general paralysis of the insane; (7) dementia; 8) certain forms of mania without distinct etiological relations.—(Dwight's *Medical Jurisprudence.*)

8. *Application of hydrostatic test, to determine whether a dead infant was born alive:* "Having opened chest, note *position* of lungs (*before* respiration they occupy a small space at upper and posterior parts of thorax); their *volume* (of course increased after breathing); their *shape* (before respiration, borders sharp or pointed; after it, rounded); their *color* (before breathing, brownish-red; after it, pale red or pink); their *appearance* as regards disease and putrefaction; and whether they *crepitate* on pressure (as they will *after* respiration). Take out lungs with heart attached, and place them in pure water having temperature of surrounding air. Note whether they float (high or low), or sink (slowly or rapidly). Separate them from the heart and weigh them accurately; then place them in water again, and note sinking or floating, as before. Subject each lung to pressure with the hand, and note sinking or floating again. Cut each lung in pieces and test floating again. Take out each piece,

wrap it in a cloth, and compress with fingers as hard as possible, and test floating, etc., as before. The crucial test of *perfect respiration* is each piece floating after the most vigorous compression."—(King's *Manual of Obstetrics.*)

9. In case of doubtful maternity, the following points might help to fix the responsibility: Resemblance of face, features, voice, gesture, attitude, habits, deformities; absence of one of the "claimants" beyond the seas for a much longer period than that of the particular gestation.

10. It may be impossible to prove the fact of an abortion. The evidence will depend on the signs of a recent delivery and examination of the product of conception. If the case is a criminal one, and was carelessly performed, there may be evidence of the use of instruments, sepsis, etc.

Signs of recent delivery.—In the living: Woman is more or less weak, and incapable of exertion; pallor; soft abdomen with relaxed skin, and lineæ albicantes; breasts, full, tumid, and secreting milk; presence of colostrum corpuscles in the milk; secondary areola; external genitals relaxed and tumefied; os uteri swollen and dilated; fundus hard and globular; lochial discharge; absence of fourchette; lacerated cervix. *In the dead:* Uterus enlarged, thick and soft; uterus contains blood, clots, and debris of decidua; tubes and ovaries congested.

"HYGIENE."

1. Diseases believed to be acquired by inhalation of microorganisms from the air: Tuberculosis, pneumonia, diphtheria, measles, scarlet fever, whooping cough, erysipelas, influenza.

2. An adult, at rest, takes about sixteen respirations a minute; the tidal air is about 500 c.c. Therefore $500 \times 16 = 8000$ c.c. of air are respired in a minute. Inspired air contains 21 per cent. of oxygen; therefore $80 \times 21 = 1680$ c.c. inspired per minute, or $1680 \times 60 \times 24$, or 2,419,200 c.c. inspired per day. By the same method it may be calculated that an adult expires $352 \times 60 \times 24$, or 5,068,800 c.c. of carbon dioxide a day (4.4 per cent. of expired air being carbon dioxide).

Ventilation: "The principal means of ventilation are the windows, doors, and the artificial openings especially made for the purpose. The occasional opening of doors and the opening of windows greatly assist the exchange of air in ordinary dwellings, with not too many persons in the rooms and with but ordinary *illumination and heating.* When the number of per-

sons in rooms is large and the number of lights increased, the windows and doors may not be sufficient for adequate ventilation, and special artificial openings may be needed. The number and character of such openings vary in size, location, shape, character, etc. The openings may be in the shape of tubes or boxes placed within the windows, the sashes, the panes, the walls at different points, the ceilings, or the floors. All such openings communicate with the external air, and serve as air inlets, or outlets, and may also be provided with adjustable gates, so that they may be closed up when not wanted. The number of ventilating devices is very large; their value depends on their location and size and character. Where local heating is used within the house, ventilation is aided by the necessary chimney and fire openings, and by the use of grates and stoves. The advantages of mechanical ventilation are the constancy of the exchange of air, the independence from any other means, the perfect control of the velocity and volume of the supplied air, the possibility to accurately regulate the temperature, quantity, moisture, and purity of the incoming air. Mechanical ventilation is, as a rule, carried on from a central point, and is of three kinds: *plenum*, or propulsion method, in which pure air is driven into the house from outside; *vacuum*, or exhaustion method, in which the impure air is withdrawn from the house; and the *combined vacuum and plenum* methods."—(Price's *Hygiene and Public Health.*)

3. "Fifty gallons of water per day is a safe average minimum, while in large cities and civilized communities a supply of 300 gallons and more per person is not excessive."—(Price.)

Diseases caused by the use of impure water are: Typhoid, cholera, dysentery, diarrhea, goiter, intestinal parasites, metallic poisoning, vesical calculi.

4. The mere presence of nitrites in water is suspicious, while the amount of nitrates must be marked before the water containing the same is regarded as suspicious. The presence of these salts in water indicates organic nitrogenous matter which has undergone chemical changes.

5. *Milk may be sophisticated or adulterated* by: (1) Skimming; (2) the addition of water; (3) the addition of coloring matter, such as caramel, annatto, or methyl orange; (4) the addition of preservatives, as boric acid, formaldehyde, salicylic acid, or salicylates; (5) the addition of arrowroot, flour, sugar, glycerine, chalk, or sodium carbonate.

The greatest danger in such adulteration is in the transmission of the microorganisms of infectious diseases which may be present in the dirty water with which the milk is diluted.

6. *Meat may be unfit for food* owing to: Disease of the animal; unfit condition and surroundings of living animals; post-mortem changes; infection of the meat by persons or places of manufacture, sale, etc.; and by adulteration. This last may consist in: "(1) Addition of foreign substances reducing, lowering, or injuring the quality of the food. (2) Partial or entire substitution of an inferior substance. (3) Extraction of some of the valuable substance from the meat. (4) Coloring, coating, or otherwise changing the appearance of the food, whereby poor quality is concealed, or it is made to look better than it is. (5) Addition of some foreign substance to 'preserve' it."—(Price's *Epitome of Hygiene.*)

7. *Diseases transmitted by flies:* Typhoid, cholera, plague, tuberculosis, dysentery, anthrax, and intestinal parasites.

8. In locating a well for drinking water on a farm, care should be taken that it is so situated that no water can flow into it from stables, manure pits, privies, cesspools, cattle-pens, etc. Further, the well must be well covered; and all around its opening should be a properly cemented border.

9. To prevent the spread of typhoid fever: Flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over. Further, each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food.

"When the patient has recovered from an infectious disease, he should be given a general bath with soap and water. In addition to this, he may be bathed with chlorinated soda solution, and in the exanthemata it may be advisable to anoint his body again unless all desquamation has ceased. After a general bath has been given the patient may be allowed to mingle with

the well. In most localities the convalescent from certain diseases, especially smallpox, is washed with 1:2000 bichloride of mercury solution, clothed with clean clothing, and then transferred to a disinfected room.

"The clothing and bedding which are to be disinfected by means of steam should be carefully wrapped in cloths saturated with 1 per cent. carbolic solution, placed in a wagon, and taken to the disinfecting station. After the bed has been stripped, all refuse matter, paper, and articles of little value are wrapped in cloths saturated with carbolic acid and burned in a stove or furnace. The floor, doors, windows, furniture, and the walls for a distance of 1½ meters from the floor should be washed with 5 per cent. carbolic acid solution. The walls and ceiling of the room should subsequently be sprayed with 1:1000 bichloride of mercury solution. If the walls are papered, it is advisable to remove carefully the paper before beginning the disinfection. The room is then closed as tightly as possible and disinfected by means of formaldehyde."—(Bergey's *Hygiene.*)

10. To *fumigate by sulphur dioxide:* For each 1,000 cubic feet of space, three pounds of sulphur are burned, care being taken to prevent accidents. In every case all apertures and crevices of the room should be closed, all closets, drawers, or other receptacles opened; and after the fumigation the room should be well ventilated and thoroughly cleansed with a solution of corrosive sublimate.

STATE BOARD EXAMINATION QUESTIONS.

Medical Examining Board of Virginia.

ANATOMY.

1. Name and describe the nerves which supply the eye.
2. Describe the aorta and name its branches.
3. Locate and give description of the kidney.
4. Give common characters of ribs—name and tell in what way the peculiar ribs differ from the others.
5. Name and describe the adductor muscles of the thigh.
6. Describe the ureter.

HISTOLOGY.

1. Name the elementary tissues of the body.
2. Name the forms of muscle and state principal location of each.
3. Give principal sources of white and red blood corpuscles.
4. Give histological structure of spleen.

VIRGINIA.

PHYSIOLOGY.

1. Describe normal urine; giving color, specific gravity, reaction, visible contents and amount daily secreted.
2. Give amount of solids secreted daily by a healthy man. Of what do these solids mainly consist?
3. Under what conditions does albumin appear in urine?
4. Give methods of stimulating muscles to contraction.
5. What is meant by clonic and tonic contraction of muscles?
6. Name the ductless glands, giving location of each.
7. What substances must be taken into the body in order to afford proper nutrition to the cells and in what forms are these substances excreted from body after being utilized by cells?
8. Give function and location of gall-bladder and its connections with other organs.
9. What condition of the blood causes the phenomena known as dyspnea, apnea, and asphyxia?
10. As regards respiration, what is meant by tidal air? Reserved air? Residual air?

EMBRYOLOGY.

1. Name different types of embryonic cells. In what structures of body is each type chiefly concerned?
2. From what sources does the placenta derive its structure and what are the three functions of placenta in fetal life?

CHEMISTRY.

1. Name four classes of the compounds of C.
2. Tell something of Bi., naming its medicinal salts, and the preparation of the subnitrate.
3. What do you mean by proteolytic changes, and give an example.
4. Name a source of the following: (1) Myronic Acid. (2) C_2N_2. (3) Dextrin. (4) Paraffin.
5. Name five substances obtained from the destructive distillation of crude petroleum.
6. What are the amido acids and what is their importance?
7. In a case of infantile diarrhea how could you determine if (1) protein, (2) fats, or (3) starch were undigested by an examination of feces?
8. Give a test for (1) acetone, (2) bile pigments in urine.
9. Give the solubility or the reverse of following: (1) $AgNO_3$. (2) $Ca_3(PO_4)_2$. (3) $PbSO_4$. (4) $CaCO_3$. (5) NaCl. (6) $MgCl_2$. (7) FeS. (8) N_2SO_4. (9) $NaNO_3$. (10) ZnO.

10. Give the chemical composition of average atmospheric air.
11. Name chemical constituents of urinary calculi.
12. Give chemical test for presence of morphine.

MATERIA MEDICA.

1. State difference between a tonic and a stimulant, giving an example of each.
2. What are the preparations and doses of arsenic?
3. What is alcohol and what its medicinal uses?
4. Give doses of following: Creosote, sulphate of spartein, phenacetine, caffeine citrate, atropine, potassium iodide.
5. Give the classification of gentian, chloroform, magnesium sulphate, strophanthus, santonine, viburnum prunifolium.
6. What are the principal medicinal uses of digitalis?
7. What are (1) antiseptics, (2) germicides, (3) deodorants? Giving an example of each.

TOXICOLOGY.

1. Give symptoms, minimum fatal dose, and treatment of poisoning by arsenic.
2. When lucifer match heads are taken into stomach what is best treatment and what should be especially avoided?
3. Give chemical and physiological antidotes for opium, strychnine, and carbolic acid.

THERAPEUTICS.

1. Classify emetics and give two examples in each class.
2. Give therapeutic uses of digitalis and the objections to its long continued use.
3. Give uses of iodine and name preparations most prescribed internally.
4. Name the urinary acidifiers and state whether the bicarbonates should be given before or after meals for such effect.
5. Give the leading action of each of the three principal mineral acids.

PATHOLOGY AND BACTERIOLOGY.

1. What is meant by the term "compensation" as used in heart diseases? Trace the course of events due to broken compensation.
2. Give the etiology and pathology of erysipelas. Through what channels does it spread?
3. Discuss syncope, shock, and collapse, and state what features are common to all three conditions.
4. Distinguish between hemoptysis and hematemesis.

Name the diseases of the organs that may produce the latter.

5. Describe the phenomenon known as Cheyne-Stokes respiration. State some of the conditions in which these respirations appear, and give the prognosis of same.

6. Give the pathology of nephrolithiasis.

7. The power to induce (by biological reaction) the formation of what distinguishes toxins from other poisons—such as alkaloids?

Of what disease is the *Spirocheta pallida* the exciting agent?

8. How do bacteria multiply? Mention three pathogenic bacteria that may be conveyed from the soil. Describe the *Bacillus tetani*.

9. How does an antitoxin differ from a vaccine?

10. How would you prepare and stain a specimen of sputum to examine for the baccilli of tuberculosis?

PRACTICE OF MEDICINE.

1. Differentiate from one another—apoplexy, epilepsy, alcoholic intoxication, and uremia.

2. Give the etiology and clinical symptoms of catarrhal (broncho or lobular) pneumonia.

3. Differentiate cardiac hypertrophy from cardiac dilatation.

4. Define: urticaria; herpes zoster; astigmatism; amnesia; aphasia.

5. Give the clinical symptoms and treatment of acute nephritis.

6. Describe a typical case of measles from the time of infection to its close.

7. Give the clinical symptoms of eczema and its treatment, including diet.

8. Give the principal measures for protection against malarial, typhoid, and yellow fever.

9. Give the treatment for follicular tonsillitis.

10. What factors determine normal blood-pressure and what is the normal pressure for an adult?

OBSTETRICS AND PEDIATRICS.

1. Diagnosis of pregnancy at third month.

2. Diagnosis of extrauterine pregnancy.

3. (a) Dangers of the use of chloroform during pregnancy and labor. (b) Indications for use of an anesthetic during labor.

4. What constitutes morbidity during the puerperium and mention most important means of preventing same.

5. Management of the third stage of labor.

6. Mention the indications for the induction of labor.

7. Management of a case of pharyngeal diphtheria.
8. Causes and diagnosis of a case of empyema.
9. Differentiate between subacute cervical adenitis, tuberculous adenitis of bovine type, and tuberculous adenitis of human type.
10. Give the number of calories and the percentage of fat, sugar, proteid, and lime water in the following milk mixture:

Milk, 4 per cent	15	ounces
Sugar of milk	1⅛	"
Lime water	1½	"
Plain water	13½	"
	30	"

SURGERY AND GYNECOLOGY.

1. Describe operation for removal of the glands of the neck; what vessels and nerves would likely be injured, and how avoided?
2. Give diagnosis and treatment of synovitis of knee-joint (non-tubercular).
3. Diagnosis and treatment of fracture of neck of the femur.
4. Give the operation for radical cure of umbilical hernia; name tissues that are brought together.
5. Differential diagnosis between congenital and acquired talipes.
6. Etiology and treatment of osteomyelitis; what part of the bone does it usually attack?
7. Give diagnosis between hematocele and hydrocele of tunica vaginalis, with treatment of each.
8. Etiology, diagnosis, and treatment of pyelonephritis.
9. What relative position to each other do the ends of the bone occupy in a Colles fracture? Give method of reductional treatment.
10. Diagnosis and treatment of acute anterior; acute posterior urethritis.
11. Describe in detail operation for complete rupture of perineum.
12. Give treatment of retroversio uteri.

HYGIENE AND PREVENTIVE MEDICINE.

1. What is the safest disposal of public sewage? Describe the process.
2. Briefly outline the precautions to be taken in a community where typhoid fever has developed.
3. (a) For the purification of large quantities of water, such as is needed for large cities, what is the most available, satisfactory, and efficient method? (b) Construct a rough outline of the general arrangement of a filter plant.

4. (a) What is the difference in antitoxins and bacterial vaccines? (b) Give example of each. (c) How should they be used?
5. Give prophylaxis of hook worm disease.

MEDICAL JURISPRUDENCE.

1. Give proper manner of making post-mortem examinations.
2. What would be the appearance of a body that had been drowned, and not to have been in the water more than two or three hours?
3. What constitutes a "Live Birth?"
4. What is the appearance of an infant born alive at full term?
5. What do civil and criminal responsibility imply?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

MEDICAL EXAMINING BOARD OF VIRGINIA.

ANATOMY.

1. The nerves which supply the eye are the second cranial, or optic nerve; the third cranial, or motor oculi; the fourth cranial, or trochlear; the sixth cranial, or abducens.

SECOND OR OPTIC. "*Origin:* from optic tract, which arises by two roots: *Outer,* from external geniculate body, optic thalmus, and brachium of superior quadrigeminal body. *Inner,* from internal geniculate body. *Course.*—Winds across outer and anterior surfaces of crus cerebri, uniting with fellow to form optic commissure, which is bounded in front by the lamina cinerea and behind by the tuber cinereum; the nerves separate at fore part of commissure, get ensheathed in arachnoid, and pass into orbit through optic foramen above and internal to ophthalmic artery; while passing through, each receives a tube of dura mater, which divides into two, the outer piece becoming orbital periosteum, and the inner, ensheathing the nerve, joins the sclerotic in front. The nerve pierces sclerotic and choroid coats of eyeball. *Distribution.*—Expands to form retina. *Special function.*—Nerve of sight."

THIRD OR MOTOR OCULI. "*Superficial origin:* inner side of crus cerebri, just in front of pons. *Deep origin:* floor of aqueduct of Sylvius. *Course.*—Pierces dura mater to enter canal in outer wall of cavernous sinus near posterior clinoid process, lying above and internal to fourth nerve. As it passes forward to enter orbit through sphenoidal fissure, the fourth nerve and frontal branch of fifth cross

and become superior to it. It divides into two branches in the fissure, which enter orbit between the heads of the external rectus, the nasal branch of the fifth lying between the two; while in cavernous sinus it communicates with cavernous plexus. *Distribution.*—Superior branch supplies superior rectus and levator palpebræ. Inferior divides into three for internal rectus, for inferior rectus, and for inferior oblique, which latter gives off short or motor root to the lenticular ganglion. *Special function.*—Motor nerve of eyeball."

FOURTH OR TROCHLEAR. *"Origin—Superficial:* valve of Vieussens, just behind corpora quadrigemina. *Deep:* floor of aqueduct of Sylvius. *Course.*—Winds round outer surface of crus cerebri and pierces free border of tentorium; passes forward in outer wall of cavernous sinus below third, but enters orbit through sphenoidal fissure above and internal to the other nerves and external rectus. *Distribution.*—Enters orbital surface of superior oblique. *Special function.*—Motor nerve of superior oblique."

THE SIXTH OR ABDUCENS OCULI. *"Origin—Superficial:* from the sulcus between the pons and medulla, anterior to the anterior pyramid. *Deep:* floor of fourth ventricle beneath fasciculus teres. *Course.*—Pierces dura mater on basilar process and grooves side of dorsum ephipii to reach cavernous sinus; lies to outer side of internal carotid, and below the other nerves. Enters orbit by sphenoidal fissure, between the heads of the external rectus, lying above ophthalmic vein. *Distribution.*—External rectus (ocular surface.)" (*Aids to Anatomy.*)

2. The aorta commences at the upper part of the left ventricle of the heart, ascends for a short distance, then arches backward and to the left, passes over the root of the left lung, then down the left side of the spinal column, passing through the aortic opening in the diaphragm, and terminating opposite the fourth lumbar vertebra, where it divides into the right and left common iliac arteries. *Branches of ascending aorta.*—Right coronary and left coronary; of *arch of aorta:* innominate, left common cartoid and left subclavian; of *descending aorta* (*thoracic*): bronchial, esophageal, pericardial, mediastinal, intercostal, subcostal, and superior phrenic; *of descending aorta* (*abdominal*): celiac axis, inferior phrenic, suprarenal, renal, spermatic (or ovarian), superior mesenteric, inferior mesenteric, lumbar, middle sacral, and common iliacs.

3. The kidneys are situated in the back of the abdominal cavity, one on each side of the vertebral column, behind the peritoneum, and extending from the eleventh rib to the second or third lumbar vertebra. The right kidney is

about half an inch lower than the left one. Each kidney is about four inches long, two inches broad, and one inch thick, and weighs about four and a half ounces. The kidneys are kept in place by their vessels, fatty tissue, and the peritoneum. The shape is characteristic. Each kidney is surmounted by the suprarenal gland, is surrounded by a capsule, and consists of a cortical and medullary portion. In the cortical portion are found the Malpighian corpuscles, which are tufts of capillaries, and are surrounded by a capsule which is continuous with the uriniferous tubule which ends in the renal papilla.

4. Each *typical rib* has a head, body, neck, angle, tuberosity, and sternal end.

The peculiar ribs are the first, second, tenth, eleventh, and twelfth.

The *first rib* has only a single facet for articulation with the first dorsal vertebra; and the tuberosity and angle are blended.

The *second rib* has the tuberosity and angle very close together, and the shaft is not twisted.

The *tenth rib* has only a single articular facet upon its heads.

The *eleventh rib* has no neck, no tuberosity, and but a single articular facet upon its head.

The *twelfth rib* has a single articular facet upon its head, and no neck, no angle, no groove, and no tuberosity.

5. The *adductor muscles of the thigh* are: Gracilis, Pectineus, Adductor longus, Adductor brevis, and Adductor magnus.

The *Gracilis* arises from the symphysis pubis and the pubic arch, and is inserted into the inner surface of the shaft of the tibia, just below the tuberosity.

The *Pectineus* arises from the iliopectineal line and is inserted into a line leading from the lesser trochanter of the femur to the linea aspera.

The *Adductor longus* arises from the junction of the crest with the symphysis of the pubic bone, and is inserted into the inner lip of the linea aspera. It is generally blended with the Vastus Internus and the Adductor magnus.

The *Adductor brevis* arises from the body and descending ramus of the os pubis, and is inserted into the line leading from the lesser trochanter of the femur to the linea aspera.

The *Adductor magnus* arises from ramus of pubic bone, ramus of ischium, and from tuberosity of ischium, and is inserted into the line leading from the great trochanter of the femur to the linea aspera.

6. The *ureter* is a tube about twelve inches long, con-

necting the kidney with the bladder. It enters the latter very obliquely, about an inch and a half from its fellow of the opposite side and the same distance from the beginning of the urethra. Behind the ureter are the Psoas magnus, common iliac artery and vein, sacroiliac sychrondrosis, and Obturator internus. In front are the spermatic vessels and the vessels of the colon (ascending or descending). The right ureter has the inferior vena cava at its inner side.

HISTOLOGY.

1. The *elementary tissues of the body* are: Epithelial, connective, muscular, and nervous tissues.

2. *Striated muscles* are found attached to bones. All the muscles under the control of the will are of this variety.

Unstriated muscles are found in the esophagus, stomach, intestines, trachea, bronchi, ducts of glands, blood-vessels, ureter, bladder.

Cardiac muscle is found in the heart.

3. *White blood cells* are derived from the spleen, lymph glands, lymph tissues, and bone marrow.

Red blood corpuscles are derived from the bone marrow and the spleen.

4. "The *spleen* is invested by a thick capsule, consisting of fibro-elastic tissue and a large proportion of visceral muscle fibres. The capsule sends trabeculæ into the interior of the organ. These are thick, and the nuclei of the muscle fibres in them stand out conspicuously in stained specimens. The bulk of the organ is deep red in color, and is called the spleen pulp. In the pulp are numerous whitish nodules, about the size of a pin's head. These nodules are composed of lymphoid tissue surrounding small arteries, and are called Malpighian corpuscles. The pulp consists of a network of fine fibres, with a number of flattened and branched cells situated on the fibres and at their crossings. In the spaces between the fibres are numerous red corpuscles, large lymphocytes, and other blood cells. Many of the red corpuscles undergo disintegration in the large lymphocytes, so that pigment, both intracellular and free, is present. An occasional giant cell of bone-marrow type is seen in the spleen pulp. The splenic artery breaks up at the hilus, and the branches pass into the interior of the organ along the trabeculæ. Passing away from the trabeculæ, their outer coat becomes surrounded at intervals by nodules of lymphoid tissue—the Malpighian corpuscles. Each corpuscle usually shows a germ center. The arteries open into capillaries, which, in turn, open into the interstices of the pulp. From the pulp

spaces there open wide venous sinuses, which are encircled by fibres of the reticulum, and are lined by a very prominent endothelium. These sinuses open into the radicles of the splenic vein." (*Aids to Histology.*)

PHYSIOLOGY.

1 and 2. The urine is a fluid, of pale yellow color, acid reaction, characteristic odor, specific gravity about 1015 to 1025, and contains water and solids. The amount excreted daily is about 50 ounces; of this quantity, between 900 and 1000 grains are solids.

SOLIDS IN THE URINE.	VOIDED PER DAY.
Organic—	
Urea	about 500 grains.
Uric acid	about 10 grains.
Hippuric acid	about 6 grains.
Creatinin	about 12 grains.
Extractives	about 150 grains.
Inorganic—	
Sodium chloride	about 150 grains.
Phosphates	about 37 grains.
Sulphates	about 24 grains.
Oxides of calcium, magnesium, sodium, and potassium.....	about 20 grains.

3. *Albumin appears in the urine* in: Inflammation and degeneration of the kidneys; increased blood pressure in the kidneys; certain exanthemata, such as scarlet fever; following drugs, such as mercury, cantharides; pregnancy, purpura, scurvy, leukemia, anemia, and other diseases; diseases of the heart and coronary arteries.

4. Muscles may be stimulated to contraction by various stimuli: Chemical, mechanical, thermic, electric, and nervous.

5. In *tonic* muscular contraction the muscle remains for some time in a state of rigid contraction; in *clonic* contraction, the muscle alternately contracts and relaxes.

6. DUCTLESS GLANDS: (1) The *spleen;* situated in the back part of the left hypochondriac and epigastric regions, being covered by the ninth, tenth, and eleventh ribs on the left side. (2) The *thyroid;* situated on the sides and in front of the upper part of the trachea, and extending upward on each side of the larynx. (3) The *suprarenals;* situated in the back part of the abdominal cavity, behind the peritoneum, one on the upper extremity of each kidney, and slightly also on the inner and anterior surfaces. (4) The *carotid gland;* situated generally in the carotid bifur-

cation. (5) The *thymus;* situated in neck, and superior mediastinum, up to lower border of thyroid. (6) The *coccygeal gland,* at the tip of the coccyx. (7) The *parathyroids;* situated near the thyroid, on the posterior surface, near the junction of the pharynx and esophagus; but they are variable in position.

7. The cells of the body require: Water, inorganic salts, proteids, fats, and carbohydrates. *Water* leaves the body in the urine, perspiration, feces, and expired air. *Sodium chloride leaves* the body in the urine and perspiration. *Sodium phosphate* leaves the body in the urine, perspiration, and mucus. *Sulphates* leave the body in the urine, saliva, feces, mucus, and perspiration. *Carbonates* leave the body in the urine. *Calcium phosphate* leaves the body in the urine, feces, and perspiration. *Magnesium* and *ammonium salts* leave the body in the urine. *Nitrogen* leaves the body in the urine and feces. *Carbon* leaves the body in the urine, feces, and expired air.

8. The *gall bladder* is a reservoir for the bile. It is situated on the under surface of the right lobe of the liver, to which it is connected by vessels and connective tissue. It is also in relation with the transverse colon, the duodenum, and sometimes with the pyloric end of the stomach.

9. *Asphyxia* is due to lack of oxygen in the blood.

Apnea may be due to excess of any gas in the blood, or to lack of oxygen.

Dyspnea is due to lack of oxygen or excess of carbon dioxide in the blood.

10. *Tidal air* is the air which is inspired and expired during ordinary respiration.

Reserve air is the extra air which can be expelled by a forcible expiration.

Residual air is the air which cannot be expelled from the lungs, even by a forcible expiration.

EMBRYOLOGY.

1. The different types of embryonic cells are the epiblastic, hypoblastic, and mesoblastic.

"From the *epiblast* are developed: The epithelium of the mouth and salivary glands and the enamel of the teeth; parts of the nose, eye and ear; the nervous system, the pituitary and pineal bodies, the medulla of the suprarenal gland. From the *hypoblast* are developed: The epithelium of the alimentary canal between the pharynx and the anal canal, and of the liver and pancreas; the epithelium of the respiratory passages and lungs; the epithelium of the Eustachian tube and tympanium; the thyroid gland; the epithelium of the bladder and parts of the genitourinary tract. From the *mesoblast* are developed: The connect-

ive tissues; the muscles; the blood vessels, blood cells, spleen, and lymph nodes; the epithelium of the kidney, the cortex of the suprarenal, the epithelium of the reproductive organs, and of part of the genitourinary tract." (*Aids to Histology.*)

2. The *placenta* is developed from the decidua serotina and chorionic villi. The placenta serves as: (1) a respiratory organ, (2) an excretory organ, and (3) a means of nutrition to the fetus.

CHEMISTRY.

1. Saturated aliphatic compounds, unsaturated aliphatic compounds, carbocyclic compounds, and hetercocyclic compounds.

2. *Bismuth* is a trivalent element, with atomic weight of 208. It is classed by some writers with antimony, by others with phosphorus, and by others again with the metals, and sometimes it is placed in a class by itself. It is found free, also as the trioxide and trisulphide. It is usually contaminated with arsenic. The medicinal salts are: Citrate, bismuth and ammonium citrate, subcarbonate, subgallate, subnitrate, subsalicylate.

Bismuth subnitrate is made by the action of water on bismuth nitrate:

$$Bi(NO_3)_3 + H_2O = BiONO_3 + 2HNO_3$$

3. Proteolytic changes are changes effected in proteins during their digestion, and are caused by the action of proteolytic enzymes. Thus pepsin splits up proteins into proteoses and peptones. The change is probably associated with the addition of some molecules of water to the protein group.

4. *Myronic acid* exists in the seeds of black mustard.

Dicyanogen is prepared from mercuric cyanide.

Dextrin is derived from starch.

Paraffin is derived from petroleum.

5. From petroleum may be obtained: Cymogene, rhigolene, gasolene, naphtha, and benzine.

6. *Amido acids* are derived from aliphatic acids by the substitution of one NH_2 group for one atom of hydrogen in the hydrocarbon group. They are basic on account of the presence of the NH_2 group, they are also acid, because they retain the COOH group. Their importance is due to the number of physiological compounds which belong to this class; such are leucin, tyrosin, tryptophan, lysin, alanin, and ornithin.

7. If the *proteid* is undigested, casein may be present in the stools, or the latter may be excessive, formed, with a pale or white color. If *fat* is undigested, the stools may be *oily or glistening*, whitish or grayish in color, and fat

globules or crystals may be detected. If *starch* is undigested, starch granules may be seen, and a blue reaction obtained with iodine.

8. *Test for acetone in urine.* Add a few drops of a freshly prepared solution of sodium nitroprusside, and then KOH solution; in the presence of acetone the liquid is colored ruby-red, and becomes purple if acetic acid is added in excess.

Test for bile pigments in urine: Put 3 c.c. of nitric acid in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

9. $AgNO_3$ is soluble in water. $Ca_3(PO_4)_2$ is sparingly soluble in water, but is soluble in acids. $PbSO_4$ is insoluble in water, but sparingly soluble in acids. $CaCO_3$ is insoluble in water, but soluble in hydrochloric or nitric or nitrohydrochloric acid. NaCl is soluble in water. $MgCl_2$ is soluble in water. FeS is insoluble in water, but soluble in hydrochloric or nitric or nitrohydrochloric acid. Na_2SO_4 is soluble in water. $NaNO_3$ is soluble in water. ZnO is insoluble in water, but soluble in hydrochloric or nitric or nitrohydrochloric acid.

10. Average atmospheric air consists of oxygen 20.9, nitrogen 79.0, and carbon dioxide 0.04 per cent.

11. *Urinary calculi* may consist of: (1) Uric acid, sodium urate, ammonium urate, calcium oxalate, calcium phosphate, ammonio-magnesium phosphate. (2) Cystin, xanthin, urates of potassium, calcium and magnesium, calcium carbonate.

12. *Test for morphine:* Add to the suspected substance a solution of neutral ferric chloride; the presence of morphine is indicated by the appearance of a blue color.

MATERIA MEDICA.

1. The terms stimulant and tonic are both used laxly. In Foster's *Dictionary of Practical Therapeutics* stimulants are defined as "agents whose influence is to augment the vital activity or function of an organ or to increase the vital energy of the entire system." *Tonics* are said to be "measures which are employed for the purpose of restoring permanent energy or tone to weakened, impaired, or diseased organs or systems of organs or the organism at large." Alcohol is an example of a stimulant; strychnine, of a tonic.

2. Arsenic trioxide, gr. 1/20; solution of arsenous acid ♏viij; solution of potassium arsenite, ♏viij; sodium ar-

senate, gr. 1/10; exsiccated sodium arsenate, gr. 1/20; solution of sodium arsenate, ♏iij; arsenic iodide, gr. 1/10; solution of arsenic and mercuric iodide, ♏jss.

3. Alcohol is a liquid containing about 93 per cent. of ethyl alcohol and about 7 per cent. of water. It is used medicinally as an antiseptic, astringent, and refrigerant; for bruises and sprains; in headaches, in fevers; to check sweating; in diphtheria, pneumonia, snake-bite; as a stimulant, a food, and as a diuretic.

4. Dose of creosote, ♏iij; sulphate of sparteine, gr. 1/5; phenacetine, gr. vijss; citrated caffeine, gr. ij; atropine, gr. 1/160; potassium iodide, gr. vijss.

5. Gentian is a stomachic; chloroform, an anesthetic; magnesium sulphate a cathartic; strophanthus, a circulatory stimulant; santonin, an anthelmintic; viburnum prunifolium, an antispasmodic.

6. *Therapy of digitalis:* Digitalis is indicated in diseases of the heart, (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in nonvalvular cardiac affections; (4) in irritable heart, due to nerve exhaustion. Digitalis is also a diuretic; and it is also used in some forms of nephritis, exopthalmic goitre, pneumonia, chronic bronchitis, etc.

7. An *antiseptic* is a substance which prevents or restrains putrefaction; example, cold. A *germicide* is a substance or agent which destroys bacteria and their germs; example, mercuric chloride. A *deodorant* is a substance or agent which destroys foul odors; example, sulphur dioxide.

TOXICOLOGY.

1. *Symptoms of arsenic poisoning:* Nausea, faintness pain in stomach, vomiting, purging, and pain in extremities; the vomitus is blood-streaked. *Minimum fatal dose* is probably between two and four grains. *Treatment* consists in the administration of freshly prepared solution of ferric hydroxide.

2. Give an emetic (copper sulphate or apomorphine), or wash out the stomach with a 0.2 per cent. solution of potassium permanganate, and then with warm water. Old French oil of turpentine is said to be the physiological antidote. Fats and oils are not to be administered. (Note that Old French oil of turpentine is not an oil chemically.)

3. *Opium.* Potassium permanganate is a chemical antidote; caffeine, strong coffee, strychnine, nitroglycerin, and cocaine are said to be physiological antidotes.

Strychnine. Tannin is the chemical antidote; chloral and chloroform are physiological antidotes.

Carbolic acid. Alcohol and sodium sulphate are said to be antidotes.

THERAPEUTICS.

1. *Emetics* are: (1) *local* (which act directly on the nerve filament in the stomach or pharynx), such as alum and copper sulphate; and (2) *general* or *systemic* (which act through the circulation), such as apomorphine and ipecac.

2. See above, MATERIA MEDICA, 6. The objection to the long continued use of digitalis is its cumulative action; the heart may be so strained by overstimulation that some slight but sudden exertion may cause cardiac failure.

3. *Iodine* is an irritant, vescicant; it is used as a counter irritant in glandular tumors, cysts, hydrocele, skin diseases, fissures. It is an antiseptic and disinfectant. Iodine is but little used internally. The preparations are: Tincture of iodine, ℥iss; compound solution of iodine ℥iij, well diluted; and ointment of iodine.

4. The *urinary acidifiers* are: Acid sodium phosphate, benzoic acid, salicylic acid, vegetable acids, salol, and potassium bitartrate. The bicarbonates are not urinary acidifiers.

5. Hydrochloric, sulphuric, and nitric acids are all escharotic. Further, *hydrochloric* acid is a bleaching, deodorizing, and disinfecting agent. *Nitric* acid is a good local escharotic because its action is limited to the spot where it is applied. *Sulphuric* acid, on the other hand, has an escharotic action which spreads; this is owing to the strong tendency of this acid to unite with water.

PATHOLOGY AND BACTERIOLOGY.

1. *Compensation.* "The alterations in the systemic blood supply caused by the valvular defects of chronic endocardial inflammation are such that, if continued, the integrity of the body is threatened. To overcome the impaired functions of the valves and to maintain the general circulation, the heart increases in size and strength (*compensatory hypertrophy*). The period in which this occurs is called the *period of compensation;* its duration is indefinite. It may be recognized by the physical signs of valvular disease without any symptoms of disturbed circulation. Anything which disturbs the equilibrium as it now exists, such as acute diseases and excessive work, leads to ruptured compensation, a condition attended by cyanosis, dyspnea, edema, gastric, hepatic, and renal disturbances, and often death." (Hughes' *Practice of Medicine.*)

2. *Erysipelas* is caused by the streptococcus erysipelatis, which enters through a wound or abrasion. The skin and subcutaneous connective tissue are inflamed, and the lymphatic vessels are also involved; there is little or no pus formation, but leucocytosis is present, and the streptococci are found in and around the lymphatic channels. Round cell infiltration is common. The disease spreads by the lymphatics, and possibly also by direct continuity

3. *Syncope* is a state of suspended animation due to sudden failure of the action of the heart. *Shock* is a condition of general depression of vital activity due to a violent stimulation of the peripheral nerves or nerve endings of the sensory or sympathetic system; it may also be produced by a sudden or severe emotion. "*Collapse* is a condition of extreme depression of the nervous system, especially of the cardiac and respiratory centers. It is usually due to powerful afferent stimuli, but may be produced by slighter impulses, if preceded by conditions tending to exhaustion. Its chief manifestations are those of mental and physical prostration. The terms *collapse* and *shock* are often used indiscriminately in reference to conditions of sudden prostration due to injury of any kind. They are not, however, synonymous terms. *Shock* is essentially a reflex vasomotor paralysis with cardiac inhibition, the effect being produced through the vagi, depressor, and other nerves. The venous system thus becomes intensely congested, the condition being virtually equivalent to the occurrence of an internal hemorrhage. The output of blood from the heart is diminished, and the resulting diminution of arterial pressure causes acute arterial anemia, in which the brain, muscles, skin, etc., partake. Combined with this anemia is inhibition (*i.e.* slowing) of the heart's action, and lessened frequency of the pulse. But the flow of blood from the veins into the heart being deficient the pulse, instead of being infrequent and full, becomes infrequent and weak. Thus the heart has less work to perform as measured by output, and its pause or recuperative period is longer; hence it does not become exhausted. In *collapse*, failure of the heart and respiration of central origin is the essential feature, as shown by the frequent weak pulse and shallow breathing. Shock may precede, merge into, and terminate in collapse, or the latter may result directly from the cause of the shock if it is prolonged; but the shock is neither a necessary antecedent nor an invariable accompaniment of collapse." (From Quain's *Dictionary of Medicine.*)

Pallor and a weak or imperceptible pulse are found in all three conditions.

4.

HEMATEMESIS.	HEMOPTYSIS.
1. Previous history of gastric, hepatic, or splenic disease.	1. Previous history of pulmonary troubles.
2. Blood is vomited.	2. Blood is coughed up.
3. Blood is dark colored and not frothy.	3. Blood is frothy and bright red.
4. Blood may be mixed with food.	4. Blood may be mixed with sputa.
5. Giddiness or faintness usually precede vomiting.	5. Sensation of tickling in the throat usually precedes.
6. Nausea and weight in epigastrium.	6. Dyspnea and pains in the chest.
7. Often followed by melena (black tarry stools).	7. Is not usually succeeded by melena.

"*Hematemesis may be due* to ulcer, cancer, cirrhosis, or congestion of the liver, scurvy, purpura, hemophilia, malaria, congestion of the spleen, chronic heart disease, vicarious menstruation, traumatism, yellow fever, toxic gastritis, or rupture of an aneurysm into the stomach." (Hughes' *Practice of Medicine.*)

5. In *Cheyne-Stokes respiration* the respirations gradually become deeper and more rapid, then they become shallower and slower, and after a pause of several seconds this cycle is repeated. It is found in apoplexy, uremia, chronic nephritis, tuberculous meningitis, fatty degeneration of the heart. The prognosis is grave.

6. *Nephrolithiasis.* "In the absence of septic infection, the changes in the kidney are the result of mechanical irritation, with or without retention of urine according to the situation of the stone. The irritation induces an increase in the interstitial connective tissue, whereby the organ becomes tougher and harder, and the fatty and fibrous capsules become thickened and fused with one another, and firmly adherent to the parenchyma. The mucous membrane of the pelvis is injected and swollen, and the stone tends to become buried in it. If the stone hinders the outflow from the pelvis, hydronephrotic changes result. In some cases there is a remarkable overgrowth of fat, which originates at the hilum, surrounds the calyces, and finally replaces the parenchyma, the kidney being ultimately transformed into a solid lipoma enclosing a cavity—the pelvis—in which the stone is lodged. When

infective processes are superadded, pyelonephritis and pyonephrosis ensue. The perinephric cellular tissue also may become the seat of suppuration and of abscess. The addition of sepsis may result in the deposition of phosphates upon the existing stone, which may thereby be greatly increased in size. The opposite kidney may remain healthy, and may even undergo hypertrophy to compensate for the loss of function in the diseased organ, but it also is liable to become the seat of stone formation and of infection and suppuration." (Thomson and Miles' *Surgery.*)

7. *Toxins* are capable of producing antibodies or antitoxins; other poisons, such as alkaloids, cannot do this.

8. The *Spirochæta pallida* is the exciting agent of syphilis. Bacteria multiply by cell-division. A bacterium about to divide seems to be larger than normal, and if it is a coccus it becomes more ovoid; changes occur first in the nucleus, and the bacterium just falls in two. Cocci may divide in one, two, or three directions of space; bacilli divide transversely to their long axis, and spirilla divide transversely to their long diameter. *Three pathogenic bacteria that may be conveyed from the soil:* Bacillus tetani, bacillus edematis, and bacillus aërogenes capsulatus.

The bacillus of tetanus is characterized by its peculiar spore, formed at one end of the bacillus and giving it the appearance of a pin; it is purely anaërobic, and cannot be developed at all in the presence of oxygen. It generally comes from the soil and is found in penetrating wounds. It appears in two forms, the spore-bearing form, as described above, and the vegetative form, which is a short bacillus with rounded ends, and which may occur singly or in pairs, or may form long filaments. It grows in gelatin stab cultures in the middle of the medium and the colonies look something like a fir tree; its growth is slow, and a disagreeable odor is at the same time emitted. In bouillon, it grows near the bottom of the tube, and produces gases.

9. *Differences between an antitoxin and a bacterial vaccine:* "The antitoxic sera act directly upon the poison secreted by the living bacterial cell and neutralize its toxic property, while the bacteriolytic sera affect the bacteria themselves and destroy them or paralyze their action. Since the antibacterial sera are without effect upon the formed toxin, they are mainly useful in practice as a means of protecting against the bacterial invasion, while the antitoxic sera (*e.g.* diphtheria) may be employed to combat an infection already in progress. Broadly speaking, the latter are curative, the former protective." (Jordan's *Bacteriology.*)

10. To demonstrate the existence of *tubercle bacilli* in

the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbol-fuchsin and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue.

PRACTICE OF MEDICINE.

1. In *alcoholic coma* the coma is not usually absolute; there may be an odor of alcohol on the breath, the patient can generally be aroused by shouting in his ear; there is no paralysis; the pupils are normal or dilated; respiration is practically normal; the pulse is first rapid and later feeble, and the skin cool.

In *uremic coma* the coma is deep; there may be a urinous odor to the breath; the urine is scanty and contains albumin; there is slow pulse, with high arterial tension; the pupils are usually small and equal; respiration is deep and may be quickened; the body temperature may be above normal, or subnormal.

In *cerebral apoplexy* there is generally paralysis of the head and upper limbs, and in left-sided lesions there may be aphasia; the pulse is slow and full; the respirations are at first slow, regular, and stertorous, later on becoming of the Cheyne-Stokes type.

In *coma of epilepsy:* History of attack, with previous convulsion; the coma is of brief duration, and the unconsciousness gradually becomes less; there may be a bitten tongue or other scars.

2. *Catarrhal pneumonia* is generally secondary to some other disease such as diphtheria, whooping cough, or measles; but it may be primary. It is most frequent in childhood and old age; in the latter condition it is often secondary to some exhausting disease. It generally begins as a bronchial catarrh, the temperature becomes high, dyspnea and cough are present, the sputum may be bloody but it is never rusty, and is quite different from that of lobar pneumonia. Vocal resonance and fremitus may be increased, and subcrepitant râles may be present.

3. CARDIAC HYPERTROPHY: "Inspection reveals fullness or prominence of the precordium with a distinct impulse. *Palpation* detects the impulse one or two intercostal

spaces lower down and to the left. It is stronger and more or less diffused—the heaving impulse. *Percussion* determines an increase in the area of cardiac dullness vertically and transversely on the left side of the sternum, unless the right ventricle is also hypertrophied, when the cardiac dullness is increased to the right of the sternum. *Auscultation* in simple hypertrophy without any valvular changes detects a loud first sound of a somewhat metallic quality, the second sound being strongly accentuated. In the presence of valvular disease the characteristic murmurs are heard in addition." (Hughes' *Practice of Medicine.*)

CARDIAC DILATATION: "*Inspection* detects enlargement and distention of the superficial veins and an indistinct, often wavy and diffused, cardiac impulse. If tricuspid regurgitation is present jugular pulsation will be observed. *Palpation* confirms inspection; the impulse is feeble, irregular, and heaving. *Percussion* serves to determine extension of the area of cardiac dullness transversely and especially toward the right side. *Auscultation* in the presence of valvular lesions reveals characteristic murmurs. If there are no valvular lesions the cardiac sounds are weaker than normal and the first sound is sharper in quality than usual." (Hughes' *Practice of Medicine.*)

4. *Urticaria* is an inflammatory condition of the skin with development of wheals, and accompanied by itching and often associated with fever and gastric disturbances.

Herpes zoster is an inflammatory disease with formation of vesicles along the line of a cutaneous nerve, and accompanied by neuralgic pains.

Astigmatism is a condition of the eye in which rays of a light from a point do not converge on the retina.

Amnesia is loss of memory, especially of the ideas presented by words.

Aphasia is inability to express ideas in speech or writing.

5. ACUTE NEPHRITIS. *Symptoms:* The first evidence of the affection is the edematous condition of the face. This edema may extend and produce general anasarca. The urine is scanty, smoky in color, and of a high specific gravity. It usually contains albumin, blood-cells, blood casts, epithelial casts, hyaline casts, and free renal epithelium. Retention of urine, uremia, intense itching of the skin, dyspnea, delusional insanity, and palsies occur.

The treatment consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases pilocarpin, and by the use of warm baths, warm applications, or the vapor bath. Tincture of

digitalis (♏ 5-20 every 4 hours), tincture of strophanthus, or spartein (gr. ¼-½) may be given as diuretics. The occurrence of uremia will require prompt and energetic measures. (*Pocket Cyclopedia.*)

6. MEASLES. The incubation period is from nine to fourteen days and the disease is attended by a more or less extensive catarrhal inflammation of the various mucous surfaces of the body. The prodromes are coryza, lacrimation, photophobia, hard bronchial or croupy cough, somnolence, irritability of temper, and sometimes convulsions. The temperature rises to 100° or 104° F., and increases until the rash is fully developed. On the second day, hard papules of a dark purplish color may be seen on the palate, and on the fourth day an eruption made up of crescentic patches of small papules upon a slightly reddened base appears on the neck, forehead, trunk, and extremities. The rash remains for from one to six days, after which the symptoms subside and a branny desquamation occurs. Extension of the catarrhal inflammation may result in complications such as bronchopneumonia, laryngitis, otitis media, enteritis, tuberculosis, etc. In healthy children and in uncomplicated cases recovery is the rule. The treatment consists in rest in bed in a darkened, well ventilated room, liquid diet, isolation, and the administration of water or acidulated drinks. In the early stages an enema or mild laxative is very beneficial. (*Pocket Cyclopedia.*)

7. *Eczema.* The skin is red, swollen, hot; a discharge is present, which leads to crust formation; itching or burning is always present. The disease is often intractable. The general health must be attended to; tea, coffee, alcohol, pastry, sugar, fried meat, starches, should be reduced to a minimum or prohibited. Cathartics and diuretics are indicated, as are proper hygienic surroundings and suitable exercise. Soap should not be used over the affected part, but water containing boric acid may be employed. The crust and scales must be removed with some oily preparation, and a dusting powder of bismuth subnitrate, boric acid, or zinc oxide used. Lassar's paste has also been recommended. Tar preparations or phenol may relieve the itching, but care must be taken to use only such strengths as will not increase the irritation.

8. *Malaria* is spread by the anopheles mosquito; *yellow fever,* by the stegomyia. These mosquitoes should be kept out of the dwellings, and away from the houses. Mosquito netting should be used, swamps and weeds removed, and a general destruction of mosquitoes instituted. For *typhoid,* see HYGIENE AND PREVENTIVE MEDICINE, 5.

9. *Follicular tonsillitis* requires cold compresses to the

neck; and potassium chlorate and iron should be administered internally.

10. The *factors which influence normal blood-pressure* are: Age, posture, altitude, exercise, excitement and emotion, food, alcohol, tobacco, diseases, and quantity of the blood. The *normal pressure for an adult* is about 120 to 130 millimeters of mercury; a more liberal limit places it at from 100 to 145 for young, healthy adults.

OBSTETRICS AND PEDIATRICS.

1. *Pregnancy at the third month* should show: Absence of menstruation, changes in the mammary glands, morning vomiting, purplish hue of the vagina, the os is soft and is low in the vagina, and the abdomen is flat.

2. "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility; nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy; pains are often very severe, with marked tenderness within the pelvis; such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating; this tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The os uteri is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*" (*American Textbook of Obstetrics.*)

3. ANESTHETICS are used in labor to lessen suffering produced by labor pains; to lessen the pain attending obstetric operations; to relax the uterus when its rigid contraction interferes with version; to promote dilatation of the os uteri; to reduce excessive nervous excitement which may interfere with progress of early stage of labor; to relieve eclamptic convulsions and mania; in cases of uterine inversion to relax the constricting cervix and so facilitate replacement; in bipolar version to lessen pain of introducing the hand into vagina; to precipitate labor to suspend action of voluntary muscles and retard delivery; in all cutting operations upon the abdomen; and sometimes

in sewing up a lacerated perineum when many sutures are required. (From King's *Obstetrics.*)

Dangers: It lessens the efficiency of the uterine contractions; it predisposes to postpartum hemorrhage; and, if given too freely, may be followed by headache, nausea, and vomiting.

4. Morbidity during the puerperium is anything in addition to the normal accompaniments of an average or normal labor. Prolonged labor, shock, hemorrhages, malpresentation, or malposition, the use of instruments, abnormalities of the fetus, and sepsis are the main factors. The patient should be put in the best possible condition before labor, all abnormalities should be corrected where possible, and examinations should only be made when necessary and always with aseptic precautions.

5. During the third stage of labor, one dram of fluidextract of ergot is administered and irritation of the uterus by friction through the abdominal wall is practised for ten or fifteen minutes. If the placenta is not expelled by this time, the uterus is firmly grasped between the thumb and four fingers and compressed. Firm pressure is then made from above downward and backward in the direction of the pelvic canal. This usually causes delivery of the placenta. A vulvar pad of salicylated cotton and carbolized gauze and an abdominal pad and binder are then applied. (*Pocket Cyclopedia.*)

6. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of a fetus toward the end of pregnancy; (6) hydatidiform mole; (7) habitually large fetal head.

7. In *pharyngeal diphtheria,* the patient should be isolated and put to bed, and kept on a milk diet. The room should be well ventilated, the air kept warm and moist; mild antiseptic solutions may be used for nose and throat; the bowels should be kept open with small doses of calomel; diphtheria antitoxin should be administered as early as possible, and in a sufficiently large dose; tonics and stimulants should be given as required. The rest of the family must be kept away from the patient, and all infected articles should be soaked in a solution of corrosive sublimate or carbolic acid.

8. *Empyema* is generally secondary to pneumonia, tuberculosis, scarlet fever, or other exanthem, suppurative inflammations, or traumatism. The pneumococcus, streptococcus, and staphylococcus are the bacteria most frequently found. The condition is diagnosed by finding the symptoms of fluid in the pleural cavity; this is withdrawn by

a needle and on examination is found to be pus; a leucocytosis is also present.

9. In *subacute cervical adenitis*, the patients are generally under three years of age, there is no suppuration or caseation, the glands do not adhere to skin or deeper tissues, and the condition responds to constitutional treatment.

In the *tuberculous adenitis*, the patients are generally from three to ten years of age, caseation and suppuration generally occur, and the tubercle bacilli can be found in the pus.

To differentiate between tuberculosis of bovine type and that of human type is difficult. "There are certain slight but constant differences between the bacilli isolated from human tissue lesions and those of bovine origin. The bacilli obtained from cattle are shorter, straighter, and thicker than those obtained from man; they are cultivated less readily, as a rule, on artificial media, and they are uniformly much more virulent for rabbits. In glycerin broth 2 per cent. acid to phenolphthalein, and containing at least 3 per cent. of glycerin, the reaction produced by human cultures remains permanently acid to phenolphthalein, while with bovine cultures the originally acid reaction diminishes and when the conditions for the multiplication of the bacilli are favorable a feebly alkaline reaction is eventually reached." (Jordan's *Bacteriology*.)

10. Milk, 4 per cent. contains .04 ounces of fat, .04 ounces of sugar, and .04 ounces of proteids.

As the 15 ounces of milk is diluted to 30 ounces, these quantities will be .02 ounces.

Sugar, 2 per cent. of 30 ounces..... = 0.6 ounces
Add 1⅛ ounces (in the mixture) = 1.125 ounces

Total....1.725 ounces of sugar, which is 5¾ per cent. of 30 ounces.

Lime water, 1½ ounces = 5 per cent. of 30 ounces.

PERCENTAGES are, therefore: Fat..... 2 per cent.
Sugar of milk 5¾ "
Proteids..... 2 "
Lime water... 5 "

In 30 ounces: Fat 2 per cent. = 0.6 ounces = 18 grams
Sugar 5¾ " = 1.725 " = 51.75"
Proteids 2 " = 0.6 " = 18

The calorie coefficients (of Atwater) are:
Fats, 8.9; Sugar, 4; and Proteids, 4.

Hence Fat =18 × 8.9 cal. = 160.2 calories
Sugar =51.75 × 4 " = 207.0 "
Proteid =18 × 4 " = 72.0 "

Total..... = 439.2 calories.

MEDICAL RECORD.

SURGERY AND GYNECOLOGY.

1. "The *excision of tuberculous glands* is often an extensive and difficult operation because of the number and deep situation of the glands to be removed, and of the adhesions to surrounding structures. The skin incision must be sufficiently extensive to give access to the whole of the affected area, and to avoid disfigurement should, whenever possible, be made in the line of the natural creases of the skin. When glands are to be removed from both anterior and posterior triangles, the best access is obtained by a Z-shaped incision, the upper limb running parallel with the lower jaw, the vertical limb along the sterno-mastoid, and the lower limb parallel with the clavicle. In exposing the glands the common facial and other venous trunks may require to be clamped and tied. Care must be taken not to injure the important nerves, particularly the spinal accessory, the vagus, and the phrenic. The infra-maxillary branches of the facial, hypoglossal and its descending branches, and the motor branches of the deep cervical plexus are liable to be injured, and should, if possible, be conserved. The dissection is rendered easier and is attended with less risk of injury to the nerves if, instead of a knife, the conical scissors of Mayo are employed. In the removal of matted glands beneath the sterno-mastoid, it may be necessary to cut this muscle across and to reflect the divided ends upwards and downwards; if the muscle itself is infiltrated with tubercle, the affected portion is removed along with the glands. When the glandular mass is closely adherent to the internal jugular vein, the operation is rendered easier by ligating the vein at the root of the neck and removing it from below upwards along with the glands (Watson-Cheyne). When the glands are extensively affected on both sides of the neck, it may be advisable to allow an interval to elapse rather than to operate on both sides at one sitting. In closing the wound, the platysma and cervical fascia should be reunited by means of a fine catgut suture and the skin edges brought together by Michel's clips; if drainage is called for, a very fine glass tube should be introduced through the skin and fascia at a little distance from the main wound." (Thomson and Miles' *Surgery*.)

2. *In non-tubercular synovitis of the knee-joint*, the knee is held in a semiflexed position, the joint is hot and painful, there is a swelling on each side of the patella and also above that bone, fluctuation may be obtained. Treatment consists in immobilization of the joint, bandaging, application of lead and laudanum lotion, ice is of use in the very early stages, later on (if pain is present) hot applications

are of service; if the tension is very great leeches or aspiration may be of benefit. Later on, massage and passive movements are serviceable.

3. *Extracapsular fracture of neck of femur.* There are: History of injury; pain, bruising, and swelling; crepitus (in unimpacted fractures); loss of power of walking (as a rule); eversion; shortening of the limb; the great trochanter is raised, everted, and is nearer to the mid line. *Treatment*: Unless there is great deformity, it is not advisable to break up impaction. Bony union always occurs. The patient should be anæsthetized, and traction kept upon the leg during fixation. A stirrup extension is first put on, and then the leg is firmly bandaged to a long Liston splint, with the eversion corrected. The chest is fixed to the splint by a binder; the foot of the bed is raised, and a weight of 8 or 10 pounds is put on to the cord of the stirrup extension. Hodgen's splint may also be used. Union occurs in six weeks. (From *Aids to Surgery.*)

4. *Operation for radical cure of umbilical hernia.* "(1) Incise at first through skin and fascia only; the incision is elliptical, with upper and lower ends in the median line, and widest part opposite the greatest width of the hernia. (2) Carefully deepen the wound on one side until the abdominal aponeurosis (sheath of the recti) is reached, aiming to come down upon it a short distance to the outer side of the hernial neck. (3) Having once reached the rectal aponeurosis, similarly expose this aponeurosis and the neck of the hernial sac all around the outline of the ellipse. All bleeding is controlled by clamp and ligature. (4) The hernial sac is now incised and its contents dealt with as indicated. Adhesions are separated. Excess of omentum is ligated and excised. All remaining contents of the sac are returned to the abdomen—and kept in place by a large, anchored gauze pad—which is removed just before closure of the abdomen. (5) The entire sac, with the umbilicus and the coverings included in the ellipse, is now excised—dividing the peritoneum in an elliptical manner about the neck of the sac. (6) The peritoneum—or the peritoneum and transversalis fascia together—is sutured with interrupted or continuous gut sutures. (7) The borders of the abdominal ring—formed by the sheaths and margins of the recti muscles—are freshened with curved scissors. The edges of the ring are then brought together with interrupted sutures of kangaroo tendon or chromic gut—using either the plain interrupted suture, or the mattress type. (8) The skin and fascia (unless the fascia be thick enough to require separate gut suturing) are sutured with interrupted silkworm-gut sutures. (9) The part is

then well supported by an abdominal dressing." (Bickham's *Operative Surgery.*)

5. Points of distinction between Congenital and Acquired Talipes Equino-varus:

	CONGENITAL.	PARALYTIC.
History:	Affection has existed from birth.	Not developed till second or third year.
Feet affected:	Bilateral.	Generally unilateral.
Circulation:	Good.	Limb cold and blue.
Muscles:	Little wasting.	Marked wasting.
Electrical reactions:	Not much impaired	Absent in paralyzed muscles.
Growth of bones	Unimpaired	Impaired.

(*Aids to Surgery.*)

6. ACUTE INFECTIVE OSTEOMYELITIS. *Causes*: "The general vitality is lowered, and there is some focus of ulceration in the mouth or throat, by which organisms enter and circulate in the blood. All that is now necessary is that some part of a bone should have its vitality depressed by a blow, strain, or exposure to cold, and the organisms then attack it. The bacteria most commonly found are the staphylococci, but streptococci are present occasionally. The disease usually begins in the new growing bone at the end of the diaphysis, rarely in the epiphysis. The lower ends of the femur and radius, the upper ends of the tibia and humerus, are the commonest seats.

"*Treatment* must be very prompt. A free incision must be made through the periosteum and the pus evacuated. In any case, whether pus is found or not, the surface of bone must be gouged away to expose the medulla freely, and any gangrenous tissue scraped out. The cavity must then be washed out and freely drained. The wound in the soft structures is not closed in any part. If symptoms of pyemia occur, it may be necessary to amputate the limb through the joint or bone above, so as to cut off the source of emboli. When a large portion of, or the whole diaphysis is necrosed, there are two courses: either to cut short the disease by removing the dead portion at once, or to leave the sequestrum to stimulate the formation of an involucrum. Where there is a single bone, as in the arm and thigh, the sequestrum is left; where there is a double set of bones, as in the forearm and leg, the sequestrum is removed at once. Celluloid, zinc, and ivory rods have been inserted to stimulate osteogenesis. In most cases it is

doubtful how much bone is actually dead, so that it is better to open up the cloacæ in the newly-formed involucrum to remove the sequestrum. The cavity heals by granulation." (*Aids to Surgery.*)

7. In *hematocele*: The tumor is solid, opaque, tense or doughy, globular in outline, the onset is generally sudden with history of an injury; the scrotum may be ecchymosed.

In *hydrocele*: The tumor is elastic or fluctuating, translucent, pyriform in shape, and is chronic.

Treatment of hematocele: Rest in bed, with the parts elevated; application of evaporating lotions; if there is much effusion, paracentesis may be indicated. Radical treatment includes excision of the sac, with turning out of the clot; sometimes castration is necessary, particularly in old people, or where the pain is very severe.

Treatment of hydrocele: Tap the cavity, and remove the fluid; radical treatment includes injecting the cavity (after tapping) with tincture of iodine, or excision (partial or complete) of the tunica vaginalis.

8. *Pyelonephritis* "is usually due to extension of sepsis from the bladder in cases of stricture, enlarged prostate, and spinal injuries. It may be due to calculus in the kidney or ureter, or stricture of the ureter. Organisms spread upwards along the mucous membrane or lymphatics of the ureter or along strings of mucus, and cause pyletitis. The bacteria further invade the lymphatics around the renal tubules and give rise to abscesses. Acute inflammation causes death from uremia, but if the process is chronic pyonephrosis is the result. In acute cases a rigor follows an operation on the urinary passages, associated with fever and vomiting. The patient gets into a typhoid condition, and dies in two or three weeks from uremia. In chronic cases the onset is insidious. There is some pain in the loin and an irregular intermittent temperature. The urine is alkaline and contains pus and casts. The case terminates in death from toxemia. *Treatment.*—The cause must be attended to and the bladder regularly washed out, while a large quantity of fluids should be drunk. Hot fomentations and cuppings over the loins relieve the pain, and urotropin is the best internal antiseptic." (*Aids to Surgery.*)

9. *In Colles' fracture*, the lower fragment forms a prominence on the dorsal aspect; above the lower fragment is a well defined hollow. On the palmar aspect, just above the wrist is a projection formed by the end of the upper fragment. Reduction is effected by extension with the hand supinated and adducted, combined with manipulation of the fragments.

10. *The symptoms of acute anterior urethritis* are: An incubation period of 24 hours, a tickling or an itching

sensation of the meatus, which is red, glazed, and often colored with grayish, opaline mucus; the discharge is scanty at first, but gradually increases. At the end of 3 or 4 days the redness and congestion about the meatus increase and may cause edema, phimosis, and paraphimosis. Lymphangitis is present. The discharge becomes thick and purulent. Ardor urinæ, chordee, and frequent urination are now present. At this stage, when the urine is passed into two glasses, in the first glass the urine will be cloudy; in the second, clear. The symptoms just mentioned usually last for about 4 weeks, when they gradually abate.

Symptoms of Acute Posterior Urethritis.—The discharge decreases; the frequency of urination increases; vesical tenesmus may be present; there is considerable pain; hematuria, albuminuria, and retention of urine are also symptoms. When the urine is passed into two glasses, both specimens will be cloudy.

Treatment of acute anterior urethritis consists in rest, light diet, cleanliness, laxatives, irrigation with hot solution or permanganate of potassium (1:2,000); a one per cent. solution of protargol is also used; internally, urinary antiseptics, such as salol or methylene blue, are used. In *acute posterior urethritis,* in addition to the general treatment mentioned above, opium in suppository may be given; copaiba or salol may be administered; irrigations are discontinued; complications may require treatment.

11. *Operation for lacerated perineum:* "The labia are seized with Allis' forceps at the level of the lowest carunculae mytiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis forceps and the guide stitch in opposite directions outward and downward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double tier suture of chromic gut, two half-hitches being taken in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transversus perinei and bulbocarvernosus muscles are brought together by silkworm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal stitches

are knotted; they are removed on the twelfth day." (Hirst's *Obstetrics.*)

12. *Treatment of retroversio uteri:* Remove the cause, if possible; replace the uterus and keep it in position by pessaries, tampons, and knee-chest position; pelvic massage and vaginal douches; proper hygiene, particular attention being paid to the bowels, clothing, and exercise. *Curative treatment:* The choice lies between ventral suspension of the uterus and shortening of the round ligament.

HYGIENE AND PREVENTIVE MEDICINE.

1. The biological (or bacterial) process of sewage disposal is probably the best and safest.

"The actual changes which take place in sewage, as the result of bacterial action, are somewhat complex and obscure, but they have been aptly described by Rideal as consisting mainly of three stages. In the first stage, or that of anaërobic liquefaction and preparation by hydrolysis, the albuminous matters, cellulose, and fats are broken up into soluble nitrogenous compounds, fatty acids, phenol derivatives, gases, and ammonia. In the second stage, or that of semi-anaërobic disintegration of the intermediate dissolved bodies, a further formation of ammonia, nitrites and gases takes place. In the third stage, or that of aeration and nitrification, ammonia and carbon residues are changed into water, carbon dioxide, and nitrates."

A septic tank is a specially constructed tank for the treatment of sewage; in it the sewage as such is destroyed, and new substances are built up in its place. In *Cameron's septic tank* system "the sewage is first led into a tank from which air and light are excluded. Digestive changes take place in the sewage within this tank as the result of anaërobic bacterial action, which is favored by the darkness, the absence of air, and the perfect stillness at which the sewage is maintained. Under these circumstances much of the solid matter is rendered soluble and dissolved." (Notter and Firth's *Hygiene.*)

2. The entrance of typhoid fever into the human organism may be prevented by boiling all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food; flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed, and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough sterili-

zation of all bedding, etc., must be performed after the disease is over.

3. Filtration is an efficient method of water purification. Ordinary filter beds for the purification of water are tanks of varying size, shape, and construction; the walls may be vertical or sloping; upon the paved bottom are pipes to carry off the filtered water. Above these pipes are successive layers of coarse gravel, fine gravel, coarse sand, and at the top fine sand about four feet deep. Through these layers the water passes. *Dibdin's bacteria beds* are based on "the idea that purification in a filter bed is not brought about wholly at the surface, but that the whole bulk of the filter is concerned therein, and experiments were made to determine the results of filling a bed and restraining the outflow for different periods, thus giving the organisms throughout the bed the same opportunity for action." (Harrington's *Hygiene.*)

4. See PATHOLOGY AND BACTERIOLOGY, 9.

5. *Prophylaxis of hook-worm disease*: Children and adults should be made to wear shoes; proper toilet facilities should be provided, and their use enforced; bathing or wading in shallow water should be forbidden; a proper water supply should be available for drinking purposes; and prompt recognition and treatment of all cases should be encouraged.

MEDICAL JURISPRUDENCE.

1. Reference must be made to a large textbook on Pathology or Medical Jurisprudence; the answer is too long for insertion here.

2. "Supposing the immersion not to have been over two or three hours, and the inspection to be made immediately, the face will be found to be pale, the expression placid, the eyes half open, the eyelids livid, and the pupils dilated, the mouth half closed or open, the tongue swollen and congested, often indented by the teeth, and perhaps lacerated; the lips and nostrils covered with a mucous froth, which issues from them. The skin is cold and pale, and generally contracted so as to present the appearance called 'gooseskin.' This, being a vital act, is a pretty sure sign that the body was living when immersed in the water. It is not dependent on cold, as was at one time supposed. Cadaveric rigidity usually comes on early in the drowned, hence the body is often found with the limbs stiffened. (Reese's *Medical Jurisprudence.*)

3. To constitute a "live birth," there must be (1) complete extrusion of the child from its mother's body, and (2) some certain sign of life. The latter would be established by one or more of the following: pulsation of the

cord, beating of the child's heart, motions of the limbs, twitchings of the muscles, wrinkling of the brows, puckering of the face, opening of the eyes, even if respiration does not take place. (From Witthaus and Becker's *Medical Jurisprudence*, etc.")

4. "The *general appearance* of a child that has been *born alive* at full term and respired is something like the following: The remains of the vernix caseosa are usually seen under the axilla, and behind the ears. The eyes remain partly open, and cannot be permanently closed. The ears are not so close to the sides of the head as is the case in children born dead. The hair is perfectly dry and clean, and the swelling at the back of the head (caput succedaneum) is more prominent than in the still-born. In the *dead-born* infant who has died immediately before its birth the vernix caseosa will be found, more or less, over its entire body. The eyes are closed and the ears are in close apposition to the head. The eyelids when raised close again. The mouth is closed, and from the nostrils is often observed exudation of watery blood. The hair is glued to the head. The thorax is unexpanded and flattened, and the lungs are situated at the posterior part of the thoracic cavity; they are greater in length than in breadth, and their margins are rounded; upon pressure no crepitation is elicited. Within the trachea, which is flattened, may be found a viscid mucous secretion. The remnant of the umbilical cord appears fresher looking than that of a child that has survived its birth a few hours." (Herold's *Legal Medicine.*)

5. *Civil responsibility* refers to the responsibility which an individual has in reference to such actions as witnessing or making a will or contract, or marrying. *Criminal responsibility* refers to the responsibility which an individual has to the State for the commission of a criminal act.

STATE BOARD EXAMINATION QUESTIONS.

WASHINGTON STATE BOARD OF MEDICAL EXAMINERS.

[Answer ten (10) questions only in each paper.]

ANATOMY.

1. Describe the sacro iliac articulation, giving ligamentous attachment and nerve supply.
2. Describe the knee joint, giving ligamentous attachments, nerve and blood supply.
3. Describe the heart and its position. Give size and weight of same, with blood supply.
4. Describe the femoral artery, and give its relation to anterior crural nerve and femoral vein.

5. Describe the collateral circulation after ligature of axillary artery.
6. Name the cranial nerves in the order of their passage through cranial foramina.
7. Describe the brachial plexus.
8. What are ductless glands? Name them.
9. Describe the lungs, giving nerve and blood supply.
10. Where is the prostate gland situated? Describe its form and size.
11. Name the muscles of the eyeball and give nerve supply.
12. What is the inguinal canal? Describe the internal and external abdominal ring. Give boundaries of the canal.

PHYSIOLOGY.

1. Define human physiology.
2. Define protoplasm, and give the characteristic properties of living protoplasm.
3. Describe in detail how the placenta performs its functions.
4. Name the nerves concerned in the constriction, and in the dilatation of the pupil of the eye.
5. What is the function of the cerebellum?
6. Describe the phenomena of (*a*) asphyxia, (*b*) syncope, (*c*) sleep.
7. What is the order of occurrence of rigor mortis in the different parts of the body?
8. State the manner in which the blood circulates through the heart, and the lungs, beginning at the right auricle.
9. What would be the effect of a transverse section of (*a*) the anterior root of a spinal nerve, (*b*) the posterior root of a spinal nerve?
10. Describe (*a*) chyme; (*b*) chyle.
11. Why does the blood remain fluid in the body in life and coagulate when shed?
12. What effect is produced on the heart action by stimulation of the cardio inhibitory center?

HISTOLOGY.

1. Describe an erythrocyte. Tell how a normal cell differs in an adult human being from that found in early fetal life.
2. Define anabolism; catabolism. Discuss the vital properties of cells.
3. What layers constitute the blastoderm? (*a*) Name the structures developed from the mesothelium; (*b*) the structures developed from the mesenchyme group of cells.

4. Name the five groups of adult tissues. Describe adipose tissue.
5. Make a diagram of a cross section of the humerus, and then describe the development of the Haversian system of canals.
6. Name the histological characteristics of the cardiac muscle.
7. Describe the Peyer's patches (agminated follicles).
8. Describe a section of the human cornea.
9. Differentiate between a section of the thymus gland, and a like section of a small lymph gland.
10. Describe the structural differences between the Malpighian corpuscles of the spleen and those of the kidneys—make drawing.
11. Describe the histological structure of the lungs.
12. Describe, histologically, tactile corpuscles, where found; Pacinian bodies, where found.

GYNECOLOGY.

1. What is gynecology?
2. Name the external genital organs.
3. Define amenorrhea, dysmenorrhea, menorrhagia.
4. Give the forms of vaginitis: Give the symptoms of senile vaginitis.
5. Give causes and symptoms of endometritis.
6. Give the varieties of pelvic hematocele.
7. Differentiate: fibroid tumor, gravid uterus, and ovarian cyst.
8. Give symptoms and prognosis of carcinoma of the uterus.
9. Give symptoms and diagnosis of uterine polypi.
10. Differentiate: prolapsus uteri, rectocele, and cystocele.
11. Give varieties, causes, and symptoms of uterine displacement.
12. What are the symptoms of pelvic abscess? What the prognosis?

PATHOLOGY.

1. Mention the different kinds of tumor of the uterus, with short history of each.
2. Describe progressive changes in acute yellow atrophy of the liver.
3. Discuss hydrocephalus.
4. Give short definition of the following terms: Cystocele, embolus, keloid, lipoma, sycosis, variocele, mastitis, cholemia, apoplexy and clavus.
5. Describe leukemia; what other disease does it closely resemble and how differentiate.
6. Discuss epithelioma.

7. Give macroscopical pathology of small intestines in typhoid fever.
8. What are the findings in mitral regurgitation.
9. Give pathological anatomy in chronic parenchymatous nephritis.
10. Describe fully the progressive changes in gonorrheal rheumatism.
11. What is the pathology of locomotor ataxia.
12. Describe the pathogenesis of renal calculi.

GENERAL DIAGNOSIS.

1. How would you diagnose an acute attack of appendictis? Differentiate between an acute attack and an un-ruptured ectopic gestation.
2. Describe the cardinal symptoms of exophthalmic goitre. When should you operate and what are the dangers in operating?
3. Describe burns of the first, second and third degree. What complications are likely to arise in the latter class?
4. Describe the symptoms of intestinal obstruction and differentiate from stone in the ureter?
5. Give differential diagnosis between concussion and compression of brain.
6. What sequel frequently follows depressed fracture of skull? How would you locate such by symptoms in the superior parietal region?
7. Differentiate between tabes dorsalis and multiple sclerosis.
8. Differentiate between pleuritic effusion and gangrene of lungs.
9. Differentiate between acute albuminuria and interstitial nephritis.
10. Describe acute otitis media, and what complications are likely to arise?
11. Give diagnosis between Landry's paralysis and rabies?
12. Describe symptoms and name causes of sacro-iliac disease. Differentiate from sciatica.

BACTERIOLOGY.

1. Give four methods by which microorganisms gain entrance to the body and name two diseases of each class.
2. Name the pathogenic agents in the following diseases: diphtheria, uncinariasis, syphilis, erysipelas, malaria (estivoautumnal), abscess, acute osteomyelitis, purulent salpingitis.
3. What is meant by infection? Give the usual symptoms.

4. Define following terms: chemotaxis, strict parasite, saphrophyte, opsonins, agglutinin, antiseptic, disinfectant.
5. Describe and give the characteristics of pneumococcus.
6. In a case of suspected diphtheria how would you arrive at a positive diagnosis? Describe process.
7. Differentiate between: vaccines and antitoxins; sapremia and septicemia; septicemia and pyemia.
8. What bacteria most frequently cause puerperal fever?
9. Give short description of Gram's method of staining and state which of following bacteria are "Gram positive": tubercle bacillus, typhoid bacillus, gonococcus, diphtheria bacillus, anthrax bacillus.
10. Describe the bacillus of typhoid fever and give characteristics.
11. What is a pure culture? Name five culture media in common use.
12. Give characteristics of the tubercle bacillus.

CHEMISTRY.

1. Define chemistry, atom; molecule; density.
2. Define carbon. Illustrate, (*a*) Free; (*b*) In combination.
3. What are hydrocarbons? Illustrate.
4. What gaseous matters are found in the body during health?
5. What is sodium chloride and daily amount eliminated?
6. What are curative sera and how prepared?
7. Give pigments of bile, blood, urine.
8. What is the caloric value of food? How serviceable in the dietaries of (*a*) Infancy; (*b*) adult; (*c*) old age.
9. Give quantitative estimation of total acidity of gastric contents.
10. Give four abnormal constituents of urine and method of determining same.
11. Give ferments of pancreatic fluid and their function.
12. Essential differences between human and cow's milk.

OBSTETRICS.

1. (*a*) What is placenta prævia? (*b*) What is its frequency? (*c*) Symptoms? (*d*) Diagnosis? (*e*) What would you do if you had a case?
2. (*a*) What is prolapse of the funis? (*b*) What is its cause? (*c*) Diagnosis? (*d*) Danger? (*e*) How would you manage a case?

3. (*a*) What is the placenta? (*b*) At what time does it assume its functions? (*c*) From what is it formed? (*d*) What are its functions? (*e*) What is the channel of communication between placenta and fœtus?

4. How would you deliver a brow presentation?

5. (*a*) What is ophthalmia neonatorum? (*b*) What is its cause? (*c*) Symptoms? (*d*) What are the means of prevention?

6. (*a*) What is the vitellus? (*b*) Allantois? (*c*) Amnion? (*d*) Chorion?

7. (*a*) What is eclampsia? (*b*) What per cent of cases occur in primiparæ? (*c*) What is the prognosis to mother and child? (*d*) What is the condition of the urine? (*e*) What is its frequency? (*f*) If it occurs at eighth month of pregnancy, how should it be managed?

8. (*a*) What is eutocia? (*b*) What is dystocia? (*c*) Name varieties of dystocia?

9. (*a*) What is hydatid pregnancy? (*b*) What is its frequency? (*c*) What are its symptoms?

10. (*a*) What is ectopic pregnancy? (*b*) Give the varieties? (*c*) What is the cause? (*d*) Between what ages does it usually occur? (*e*) What are the symptoms? (*f*) What are its terminations?

11. Differentiate an ovarian cyst, a uterine fibroid and pregnancy at the fifth month.

12. Tell what you know about pelvimetry.

TOXICOLOGY.

1. Mention five (5) emetic poisons.

2. Method of conducting autopsy in death from arsenic poisoning.

3. Give one test for discovery of a mineral poison.

4. Differentiate tissue change in poisoning from hydrochloric, sulphuric, nitric and carbolic acid.

5. Give symptoms of acute arsenical poisoning.

6. Give symptoms of mercurial poisoning.

7. Method of examining dead caused by gunshot wounds.

8. Infanticide—(*a*) How determine if child born alive? (*b*) How long did it live after birth? (*c*) How determine criminal violence?

9. What signs manifest on pelvic organs in case of criminal abortion?

10. Post-mortem appearances in death from hanging. (*a*) External; (*b*) Internal.

11. What are the signs of recent delivery (parturition)?

12. Source of meat and fish poisoning.

WASHINGTON.

HYGIENE.

1. What are ptomaines. Give usual symptoms of ptomaine poisoning and the most common source.
2. In treating a case of scarlet fever what precautions should be taken to prevent spread of the contagion—by attendants? by yourself?
3. What is sewer gas and how is it objectionable.
4. State period of incubation, date of eruption and limit of quarantine in the following diseases: measles, variola, scarlet fever?
5. Give sanitary methods for the production and marketing of pure milk. Name five diseases that may be caused by impure milk.
6. What is Pasteurized milk? Give some advantages and disadvantages.
7. What do you understand by natural immunity? What is acquired immunity? Give examples.
8. Describe fully the precautions necessary in the care of a typhoid fever patient.
9. Describe two methods of disinfecting a room 20 x 15 x 10 feet, giving the amount of materials necessary.
10. Name the requisites of a successful house water filter.
11. Name six diseases to which the habitual alcohol drinker is predisposed.
12. How is malaria communicated? How may malarial districts be made healthy?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

WASHINGTON STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *Sacroiliac articulation* is an amphiarthrodial joint formed between the lateral surfaces of the sacrum and ilium. The *ligaments* are: (1) The *anterior sacroiliac*, connecting the anterior surfaces of the sacrum and ilium; (2) the *posterior sacroiliac* passing chiefly downward and inward from the rough part of the ilium to the posterior part of the sacrum; three of the fasciculi are of large size, two of them constitute the *short sacroiliac ligament* and one of them is the *long* or *oblique sacroiliac ligament;* (3) the *interosseus ligaments* which fill up the hollow existing in the posterior of the joint, and are completely covered by the posterior sacroiliac ligament. The *nerve supply* is from the superior gluteal, and sacral plexus.

2. The *knee joint* is a ginglymus, and is formed by the condyles of the femur, the head of the tibia, and the patellæ. "The *external ligaments*: The *anterior* or *ligamentum patellæ* is the continuation of the tendon of the triceps extensor. Above it occupies the apex and rough marking on the lower and posterior surface of the patella; below it is attached to the lower part of the tubercle of the tibia. There is a bursa between the upper part of the tubercle and the ligament. The *posterior ligament* (*ligamentum posticum Winslowii*), broad and thin, covers the back of the joint. It consists of a central and two lateral parts. The lateral parts spring above from the femur above the condyles and are attached below to the head of the tibia. The central part is derived from an expansion of the semi-membranosus tendon, and passes from the inner tuberosity of the tibia to the inner side of the upper part of the outer condyle of the femur. The *internal lateral ligament*, broad and flat, is attached above to the inner condyle of the femur; below, to the margin of the inner tuberosity, to the internal fibrocartilage, and to the inner surface of the shaft of the tibia for 1½ inches. The *long external lateral ligament*, a rounded cord, is attached above to the external condyle of the femur, and below to the external part of the head of the fibula, dividing the biceps tendon into two parts, a bursa intervening. The *short external lateral ligament*, very indistinct, lies parallel and behind the preceding, attached above to the outer condyle of the femur, and below to the styloid process of the fibula. The *capsular ligament*, thin, fills up the intervals between the special ligaments; it is attached to the margins of the articular surfaces of the bones, and blends with the fascia lata of the thigh: above it receives expansions from the vasti (*lateral patellar* ligaments).

"The *Internal Ligaments*: The *anterior* or *external crucial ligament* is attached to the depression in front of the spine of the tibia and to the external semilunar fibrocartilage; it passes upwards, backwards, and outwards to the posterior part of the inner side of the external condyle of the femur. The *posterior* or *internal crucial ligament* is attached to a depression behind the spine of the tibia, to the popliteal notch, and the posterior border of external semilunar fibrocartilage, this latter slip being sometimes called the *ligament of Wrisberg;* it passes upwards, forwards, and inwards, the posterior fibers attached by side of oblique curve of inner condyle, the anterior ones to the fore part of intercondylar fossa and to the anterior part of the outer

surface of the inner condyle. The *semilunar cartilages* are thicker at the circumferences than at the central margins, and serve to deepen the cavities for the head of the femur. The *internal semilunar cartilage* is oval in shape, the anteroposterior diameter being the longer. Its anterior extremity is attached to the tibia in front of the anterior crucial ligament, and the posterior extremity in front of the posterior crucial ligament. The *external semilunar cartilage* is nearly circular; its anterior extremity is attached to the tibia in front of the spine, the posterior extremity to the back of the spine." (*Aids to Anatomy.*)

3. A line from the lower border of the second left costal cartilage (one inch from sternum) to upper border of third right costal cartilage (half inch from sternum) represents the *base line;* the *right side* will be a line drawn from right side of upper limit to seventh right chondrosternal articulation; the *lower limit* is a line from this last point to the apex (in fifth intercostal space, three and one-half inches from midline); the *left side,* from left end of upper border to left of apex. The valves are: Aortic, mitral, tricuspid, pulmonary (and Eustachian and coronary.)

The *aortic valves* are behind the third intercostal space, close to the left side of the sternum. *Pulmonary valves,* in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. *Tricuspid valves,* behind the middle of the sternum, about the level of the fourth costal cartilage. *Mitral valves* behind the third intercostal space, about one inch to the left of the sternum.

In the *right auricle* are the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculo-ventricular orifice; in the fetus it directs the blood from the inferior vena cava through the foramen ovale into the left auricle; the coronary valve prevents the regurgitation of blood into the coronary sinus during the auricular contraction. In the *right ventricle* are the tricuspid and semilunar valves; the former prevents the blood in the right ventricle from flowing back into the right auricle during ventricular systole; the latter guards the orifice of the pulmonary artery. In the *left ventricle* are the mitral and semilunar valves; the former acts similarly to the tricuspid; the latter guards the orifice of the aorta. The heart is about 5 x 2½ x 3½ inches, and weighs about ten ounces. It is supplied with blood by the *right and left* coronary arteries.

4. *The femoral artery* begins at Poupart's ligament

it is the continuation of the external iliac, and passes down the fore part and inner side of the thigh, to terminate at the opening in the adductor magnus at the junction of the middle with the lower third of the thigh, where it becomes the popliteal artery.

In the upper part of its course, the anterior crural nerve is on the outer side of the artery, and the femoral vein is to the inner side; lower down the vein passes behind the artery.

5. If the *axiliary artery is ligated* (below its subscapular branch), the collateral circulation will take place by: (1) Anastomoses between the branches of the posterior circumflex and the superior profunda; (2) anastomoses between the branches of the subscapular and the superior profunda; (3) anastomoses through various muscular branches of the artery.

6. *Cranial nerves:* I. Olfactory; II. Optic; III. Motor oculi; IV. Pathetic or Trochlear; V. Trifacial; VI. Abducens; VII. Facial; VIII. Auditory; IX. Glossopharyngeal; X. Pneumogastric; XI. Spinal accessory; XII. Hypoglossal.

7. The *brachial plexus* is formed by the union and subsequent division of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves. The union of the fifth and sixth makes the upper trunk; the seventh forms the middle trunk, and the eighth cervical and first dorsal make the lower trunk. Each of these trunks is divided into an anterior and a posterior branch. The anterior branches, from the upper and middle trunks, make the upper or outer cord of the plexus; the anterior branch of the lower trunk becomes the lower or inner cord; the three posterior branches unite to form the posterior or middle cord. The plexus lies between the Scalenus anticus and medius. The *branches* are: (1) Above the clavicle; communicating, muscular, posterior thoracic, and suprascapular. (2) *From outer cord:* External anterior thoracic, musculocutaneous, and outer head of median. (3) *From inner cord:* Internal anterior thoracic, lesser internal cutaneous, ulnar, and inner head of median. (4) *From posterior cord:* Subscapular, circumflex, and musculospiral.

8. The *ductless glands* are glands which do not possess excretory ducts. They are the spleen, thyroid parathyroids, thymus, suprarenals, carotid, coccygeal pineal, and pituitary body.

9. "*The lungs* are two in number, occupying the lateral cavities of the chest, separated from each other by the heart and structures within the mediastinum. They

accurately fill the cavity of the chest at all times, and are covered by the pleura. They are conical in shape, presenting each a base, apex, two borders, and two surfaces. The apex extends upward above the level of the first rib; the base occupies the convex surface of the diaphragm; the external, or thoracic surface is accurately applied to the wall of the thorax; the inner surface is in contact with the pericardium, and is marked by a depression, the hilum pulmonis, at the root of the lungs. The posterior border rests on either side of the spinal column, and the anterior border is thin and overlaps the pericardium. The root of each lung, situated near its middle, is composed of the following structures, surrounded by a reflection of pleura: Bronchus, pulmonary artery, pulmonary veins, bronchial glands, bronchial vessels, posterior and anterior pulmonary plexuses of nerves, connective tissue. The right lung has three lobes; the left but two, of which the lower is the larger. The *nerves* are derived from the anterior and posterior pulmonary plexuses of the pneumogastric and sympathetic; ganglia are found upon these nerves. The *blood supply* is from the bronchial arteries." (Young's *Handbook of Anatomy*).

10. *Prostate gland* is about 1½ x ¾ x ½ inches, and weighs about three-quarters of an ounce. It resembles a chestnut in size and form. It is situated at the neck of the bladder, and surrounds the first part of the urethra. It consists of fibromuscular (unstriated) tissue with imbedded follicular pouches, the whole enclosed in a firm fibrous capsule, continuous in front with the triangular ligament, and behind with the posterior layer of the deep perineal fascia.

11. *Muscles of the eyeball:* Rectus superior, rectus inferior, rectus externus, rectus internus, obliquus superior, and obliquus inferior; the rectus externus is supplied by the abducens nerve, the superior oblique by the trochlear, and the others by the motor oculi.

12. The *inguinal canal* is an oblique canal situated a little above and running parallel with Poupart's ligament. It is from an inch and a half to two inches in length, runs downward and inward, and extends from the internal abdominal ring to the external abdominal ring.

Its *boundaries* are: *In front:* the skin, superficial fascia, aponeurosis of the external oblique, and (for its outer third) the internal oblique. *Behind:* the conjointed tendon, the triangular fascia, the transversalis fascia, subperitoneal fat, and peritoneum. Above: the fibers of the internal oblique and transversalis.

Below: Poupart's ligament and the transversalis fascia.

Contents: The spermatic cord in the male, and the round ligament in the female.

Internal abdominal ring: "An oval opening lying in the transversalis facia, half way between the anterior superior iliac spine and symphysis pubis, and about 1.3 cm. (½ inch) above Poupart's ligament. Superior and external boundary—curved fibers of transversalis. Inferior and internal boundaries—deep epigastric vessels. Transmits spermatic cord in male—and round ligament in female. Infundibuliform process of fascia transversalis strengthens its opening."

External abdominal ring: "A triangular opening in aponeurosis of external oblique immediately above and just external to crest of os pubis. Bounded, inferiorly, by crest of os pubis—superiorly by intercolumnar fibers, strengthened by intercolumnar fascia; internally by inner or superior pillar; externally by outer or inferior pillar. Transmits spermatic cord in male and round ligament in female."—(Bickham's *Operative Surgery.*)

PHYSIOLOGY.

1. *Human physiology* is that branch of science which deals with the functions of the human body in a state of health.

2. *Protoplasm* is the matter of which cells are made; it is the physiological basis of life, and consists of water, protein, lecithin, cholesterin, phosphates, chlorides, and other substances. Its constitution is unknown. *Properties of living protoplasm:* Irritability, or power of responding to a stimulus; power of movement; power of assimilation; power of growth; power of excretion; power of reproduction.

3. "As a separate organ, *the placenta* dates from the third month of pregnancy, and from that time gradually increases in size until the termination of pregnancy. The chorionic villi lose Langhans' layer of cells, and embed themselves into the interglandular stroma of the decidua basalis, and sometimes penetrate the mouths of the small veins. The syncytium also penetrates the endothelium of the decidual arterioles, and large blood sinuses are thus formed. By this arrangement, the fetal and maternal blood, while kept separate, are brought into such close contact that osmosis may readily occur between them, thus permitting the absorption of nutritive material from the maternal into the fetal circulation, the excretion of urea and other waste products of fetal metabolism, the passage of oxygen to the fetus, and the excretion of carbon dioxide from it.

The *functions of the placenta* may be summed up as follows: 1. It is nutritive, allowing of the passage of nutritive material to the fetus. 2. It is respiratory. Oxygen passes to, and carbon dioxide from, the fetus. 3. It is excretory, allowing the escape of urea and other products of fetal metabolism. 4. It has a glycogenic function. Glycogen is stored in its cells for the future use of the fetus. 5. It is iron storing, by which iron in organic combination is passed from the maternal circulation into the fetal circulation to be stored in the liver cells of the fetus, in order to aid in the formation of new colored blood corpuscles."—(Lyle's *Physiology*.)

4. *Constriction* of the pupil is caused by the motor oculi; *dilatation*, by the cervical sympathetic.

5. *Functions of cerebellum:* (1) Coordination of muscular movements; (2) it is concerned in maintaining the equilibrium of the body.

6. *Asphyxia.* "In considering the phenomena of asphyxia, it is necessary to distinguish between rapid asphyxia, produced by complete obstruction to the entrance of air, and slow asphyxia, which is gradually established. The phenomena of asphyxia are divisible into three stages, which are easily observed in animals, especially in the dog. In the *first stage*, called the stage of exaggerated breathing, hyperpnea, the respiration is more rapid and deeper, due to the CO_2; then the phenomena of dyspnea appear, the extraordinary muscles of inspiration and expiration are called into play, the abdominal muscles contract forcibly, the pupils are small. This stage lasts about a minute. *Second stage*, convulsive stage. Here the inspiratory muscles lose their force, while the expiratory movements become more active; next all the muscles of the body, including the expiratory ones, become convulsed, due to the carbon dioxide stimulating the central nervous system. This stage lasts about a minute. *Third stage*, or stage of exhaustion. This usually comes on suddenly, the carbon dioxide paralyzing the center of respiration; the pupils dilate, the eyelids do not close when the cornea is touched; a state of general calm ensues, which is in marked contrast with the previous agitation; consciousness is abolished; the animal lies motionless and seems dead; occasional inspiratory acts take place, then they become feebler and of a gasping character; finally, the nostrils dilate, the limbs of the animal are extended, opisthotonos ensues, the pulse disappears, and death closes the scene. This state lasts about three minutes. This pulseless condition is properly denominated asphyxia. The phenomena of slow asphyxiation follows

the same course, but less rapidly." (Ott's *Physiology.*)

Syncope is the complete, and often sudden, loss of motion and sensation with diminution or suspension of heart pulsations and respiratory movements; it may indicate cardiac disease.

Sleep.—"This phenomenon is one of many instances of the rhythmic activities of the central nervous system. From time to time all animals with a well-developed nervous system go to sleep, during which psychical activity is at its lowest point. To reach this condition the most important favoring factor is an exclusion of all or most of the impulses from the central nervous system. In a well-known case of Strümpell, in which, from a complicated anesthesia, all sensory impulses were limited in their entrance to a single eye and a single ear, the patient could be put to sleep at will by closing the eye and stopping the ear. In addition, sleep has been attributed to the following influences: 1. Chemical influences. 2. Circulatory influences. 3. Histological influences. Those who hold to *chemical influences* in the production of sleep maintain that during normal activity of the body various substances are formed which are circulated in the blood and directly lessen the activity of the nerve cells or indirectly diminish the supply of blood in the brain. In the theories of *circulatory influences* a fatigue of the vasomotor center is looked upon as the cause of the anemia of the brain resulting in sleep. In the third set of theories sleep is supposed to be due to a separation of the dendrites of the brain cells due to an active contraction or to an intrusion of neuroglia cells between them. During sleep the capability of the nervous system to transmit impulses is not entirely lost. The cerebral cortex is most affected, the spinal cord least. The close relation between dreams and external stimuli is well known and it has been proved experimentally that vasomotor changes induced by external stimuli may take place without awakening the sleeper. The period of deep sleep is short and falls within the first two hours after its onset. During this time the pulse and breathing are slower, the intestines and bladder are at rest, the output of carbon dioxide is lessened, and the consumption of oxygen still more so; metabolism is less vigorous and the temperature falls. The respiration is said to become thoracic in type and to take on a more or less pronounced Cheyne-Stokes rhythm. The visual axes are directed upward and inward, but the pupils are contracted. The latter is peculiar, since an absence of light should bring about dilatation. This is connected

perhaps with important actions taking place in lower levels of the brain." (Guenther's *Physiology.*)

7. *Rigor mortis* first appears in the muscles of the lower jaw, then spreads to the muscles of the face and neck, then to the muscles of the thorax and abdomen, then to those of the upper extremity, and finally to those of the lower extremity.

8. "The left ventricle pumps the arterial blood through the large arteries, the small arteries, and the arterioles into the systemic capillaries. For the most part between the capillaries and the tissues is the tissue fluid, and across this the tissues acquire the oxygen from the arterial blood and return carbon dioxide to the blood in the capillaries. The blood which leaves the tissues is venous. The venous blood returns from the capillaries through the small veins into the larger veins, and the largest veins pour the blood back into the right auricle. It will thus be seen that the right side of the heart is occupied with the pulmonary circulation and the left side of the heart with the systemic circulation. The right auricle receives the venous blood as it returns from the tissues, and transmits it to the right ventricle. The function of the right ventricle is to pump the venous blood through the pulmonary arteries into the lung capillaries, where the venous blood becomes oxygenated. The oxygenated blood returns by the pulmonary veins to the left auricle, and the arterial blood is then received into the left ventricle."—(Lyle's *Physiology.*)

9. Transverse section of the *anterior root* of a spinal nerve causes loss of motion and degeneration of the peripheral portion of the anterior root fibers; the sensory fibers of the posterior root are not affected.

Transverse section of the *posterior root* of a spinal nerve causes loss of sensation and degeneration, which latter differs according as the section is made on the proximal or peripheral side of the ganglion. If the section is made between the cord and the ganglion, degeneration only occurs in the piece severed from the ganglion, but connected with the cord. If the section is made beyond the ganglion, degeneration occurs in the fibers peripheral to the lesion.

10. *Chyme* is a thick, acid liquid, which is the result of gastric digestion; it consists of proteids, salts, liquefied fat, and undigested matter. It is passed forward into the duodenum.

Chyle is that portion of the lymph which is found in the small intestine during the period of digestion; it is mainly composed of water, proteids, and fats, the latter giving it a milky appearance.

11. The reason why the blood remains fluid in the body during life and coagulates when shed, is because during life the blood is kept moving and because the fibrin enzyme which normally exists in the blood plasma is neutralized by the antithrombin which is secreted by the liver cells.

12. *Stimulation of the cardioinhibitory center* inhibits or restrains the action of the heart; the frequency of the heart's action is diminished, and the strength of its contractions is lessened.

HISTOLOGY.

1. An *erythrocyte* is a non-nucleated, circular, concave disc; it contains red coloring matter, *hemoglobin;* and is about 1/3200 inch in diameter. In *adult* life it is non-nucleated; in fetal life it is nucleated.

2. *Metabolism* is the entire series of changes that occur in a cell or organism during the processes of nutrition. It is of two kinds: (1) Assimilative or constructive (anabolism), and (2) destructive (catabolism).

The *manifestations of cell life* are: Movement, ingestion, assimilation, excretion, growth, irritability, and reproduction.

3. The *blastoderm* has three layers—the ectoderm, mesoderm, and entoderm.

From the *mesothelium* are derived the flattened epithelioid cells which line the various serous cavities of the body.

From the *mesenchyme* are derived the various connective tissue cells such as bone, dentine, cartilage, fibrous and areolar tissue, lymph, and blood.

4. *The five groups of adult tissue are:* (1) Epithelial tissues, (2) connective tissues, (3) blood, (4) muscle tissue, and (5) nerve tissue.

Adipose tissue is a form of connective tissue and consists of vesicles filled with fat; these vesicles are collected into lobules, and vary in shape, being round or oval when not subjected to pressure, but polyhedral when compressed. The cell has an oval flattened nucleus situated just within the thin membrane which surrounds the cell.

5. For illustration, see Bailey's *Histology*, 3d Edition, 1910, fig. 102, p. 167.

Transverse section of compact bone from shaft of humerus (From Bailey's *Histology*):

"All bone is at first of the spongy variety. When this is to be converted into compact bone, there is first absorption of bone by osteoblasts, with increase in size

of the marrow spaces and reduction of their walls to thin plates. These spaces are now known as Haversian spaces. Within these new bone is deposited. This is done by osteoblasts which lay down layer within layer of bone until the Haversian space is reduced to a mere channel, the Haversian canal. In this way are formed the Haversian canals and the Haversian systems of lamellæ. Some of the interstitial lamellæ are the remains of the spongy bone which was not quite removed in the enlargement of the primary marrow spaces to form the Haversian spaces; other interstitial lamellæ appear to be early formed Haversian lamellæ which have been more or less replaced by Haversian lamellæ formed later."

6. *Cardiac muscle* consists of fibers of short, stubby cylindrical form, possessing striations and a delicate sheath, but no regular sarcolemma. There is a single, oval nucleus to each cell; this nucleus is centrally situated and is surrounded by pigment granules.

7. *Peyer's patches* are aggregations of solitary glands, measuring from about half an inch to three inches in length; they are found mainly in the ileum, but also occur in the duodenum, and jejunum; they are situated lengthwise in the intestine, and are located opposite to the mesenteric attachment. Each patch is surrounded by a group of the crypts of Lieberkühn. There are said to be from 30 to 50 of these patches in the human intestine. As a rule, they have no villi on their surface.

8. The *cornea* consists of five layers: (1) An anterior layer of stratified squamous epithelium; (2) an anterior elastic membrane, also known as Bowman's membrane; (3) the substantia propria consisting of connective tissue fibrils which are cemented together to form bundles and lamellæ; (4) the posterior elastic membrane of Descemet, similar to the anterior elastic membrane, but thinner; (5) the posterior endothelium of Descemet, consisting of one layer of flat hexagonal cells.

9. The *thymus* contains spherical or oval bodies of concentrically arranged epithelial cells known as Hassall's corpuscles; nucleated red blood corpuscles may be seen in the thymus; and the lymph nodules contain no germinal centers. The *lymph gland* does not contain Hassall's corpuscles and it has no nucleated red corpuscles; furthermore the lymph nodules contain germinal centers.

10. The *Malpighian corpuscles of the spleen* "are distributed throughout the splenic pulp. Each splenic

corpuscle contains one or more small arteries. These usually run near the periphery of the corpuscle; more rarely they lie at the center. Except for its relation to the blood-vessels, the splenic corpuscle is quite similar in structure to a lymph nodule. It consists of lymphoid cells so closely packed as completely to obscure the underlying reticulum. In a child's spleen the center of each corpuscle shows a distinct germinal center. In the adult human spleen germ centers are rarely seen." (Bailey's *Histology*).

The *Malpighian corpuscle of the kidney* "is spheroidal, and has a diameter of from 120 to 200μ. The structure of the Malpighian body can be best understood by reference to its development. During the development of the uriniferous tubules and of the blood-vessels of the kidney, the growing end of a vessel meets the growing end of a tubule in such a way that there is an invagination of the tubule by the blood-vessel. The result is that the end of the vessel which develops a tuft-like network of capillaries—the *glomerulus*—comes to lie within the expanded end of the tubule, which thus forms a two layered capsule for the glomerulus. One layer of the capsule closely invests the tuft of capillaries, dipping down into it and separating the groups of capillaries. This layer by modification of the original epithelium of the tubule is finally composed of a single layer of flat epithelial cells with projecting nuclei. The outer layer of the capsule lies against the delicate connective tissue which surrounds the Malpighian body. This layer consists of a similar though slightly higher epithelium and is known as *Bowman's capsule.* Between the glomerular layer of the capsule and Bowman's capsule proper is a space which represents the beginning of the lumen of the uriniferous tubule, the epithelium of Bowman's capsule being directly continuous with that of the neck of the tubule." (Bailey's *Histology*).

For illustrations see Bailey's *Histology* 3d Edition, 1910, figs. 95 and 198, pp. 159 and 289.

11. *The structure of the lungs.*—"In the lungs the bronchi branch in a tree-like manner, the final ramifications opening into the pulmonary cells. The larger intrapulmonary bronchi are lined by columnar ciliated epithelium resting on a basement membrane. Lying under this basement membrane are longitudinally disposed elastic fibers with loose connective tissue. More externally is a layer of smooth muscle fibers arranged circularly, the bronchial muscle. External to the bronchial muscle is a fibrous coat containing scattered, ir-

regular plates of hyaline cartilage. The smaller bronchi (bronchioles) have no cartilaginous plates, but their muscular coat is well marked. Each bronchiole leads into a small number (three or four) of wider thin-walled spaces, lined by flattened epithelium, and called atria. Out of each atrium open two or three blind diverticula, each of which is called an infundibulum. The walls of the infundibula are studded with hemispherical sacs known as alveoli, which are lined by flattened, non-nucleated, epithelial cells. Between adjacent alveoli there is a dense network of capillaries, supported by a small amount of fine connective and elastic tissue; the network of capillaries is thus common to the two adjacent air cells, and the blood in the capillaries is separated from the air in the alveoli merely by two thin layers of epithelium. In birds, even the alveolar epithelium appears to be absent, the blood and air being separated solely by the capillary wall." (From Bainbridge and Menzies', *Essentials of Physiology.*)

12. "*Tactile corpuscles.*—These consist of connective tissue which forms a capsule, from which are given off membranous partitions or septa. After winding around the corpuscle the axis-cylinder enters it, and terminates in an enlargement. Tactile corpuscles occur in the papillæ of the skin of the hand, foot, front of the forearm, lips, and nipple; also in the mucous membrane of the tip of the tongue and the conjunctiva lining the eyelids.

"*Pacinian corpuscles.*—These are also called corpuscles of *Vater.* Each corpuscle consists of concentrically arranged layers of connective tissue, with nucleated cells. A medullary nerve-fiber enters at one end and passes into an interior space which contains a transparent substance; here only the axis-cylinder is present. This terminates at the end of the corpuscles in an enlargement or in minute branches, an arborization. These corpuscles exist in the subcutaneous tissue of the palm of the hand and sole of the foot, and in the penis. Observers have also found them in the pancreas, lymphatic glands, and thyroid." (Raymond's *Physiology.*)

GYNECOLOGY.

1. *Gynecology* is that branch of medicine and surgery which deals with the diseases peculiar to women.

2. The *external genital organs* are: Labia majora, labia minora, clitoris, mons Veneris, and the orifice of the vagina; the external urinary meatus is generally included, though it is not a *genital* organ.

3. *Amenorrha* is absence of menstruation during the period of sexual activity.

Dysmenorrhea is unduly painful menstruation.

Menorrhagia is a condition characterized by excessive loss of blood at the menstrual period.

4. *Forms of vaginitis:* Acute, chronic, primary, secondary, catarrhal, membranous, diphtheritic, gonorrheal, tuberculous, senile, emphysematous, granular, superficial (there is no recognized classification).

Symptoms of senile vaginitis: "The *subjective* symptoms are not in any way characteristic and all the patient usually complains of is a thin, serous, leucorrheal discharge which is not profuse or constant and which is at times streaked with blood. In some cases there may be a burning sensation in the vagina, a feeling of weight in the pelvis, and a distressing irritation of the external organs of generation. Sexual intercourse is either impossible or very painful. The *objective* symptoms, on the other hand, are marked. The mucous membrane is found to be smooth, atrophied, and covered with a scanty serous secretion, while various sized spots of ecchymosis and superficial ulceration are observed scattered over its surface. Adhesions resulting from contact between the ulcerated surfaces are common, and in some cases the vaginal vault as well as other parts of the canal may be obliterated or greatly distorted."—(Ashton's *Gynecology.*)

5. "*Acute endometritis* is the result of the introduction into the uterus of septic microorganisms. This usually occurs during labor or miscarriage, or it may result from operations, such as dilatation, or from the introduction of an unclean sound. It sometimes occurs as a complication of the exanthems. If the process is severe enough, it may involve the muscular tissue underneath the mucous membrane, when it is called metritis; or the peritoneal covering of the uterus may be invaded, when it is called perimetritis. *Symptoms.*—Acute corporeal endometritis is usually attended by considerable pain, of a dull, aching character. There are constipation and vesical irritability. The pulse is rapid and temperature in some cases is very high—from 104° to 106° F. Vaginal examination reveals a patulous cervical canal with a profuse purulent discharge escaping from it. The uterus is enlarged, boggy, and tender.

"*Chronic endometritis* may result from an acute attack or it may be chronic from the beginning. One of the most frequent causes of this condition is gonorrheal infection. Chronic endometritis accompanies a variety

of pathological conditions of the uterus, such as displacements, subinvolution, laceration of the cervix, and fibroid tumors. Two varieties of chronic endometritis have been described—glandular and interstitial. The *symptoms* of chronic endometritis are usually well marked. There is pain, of a dull, aching character, most evident in the back and extending down the thighs. Leucorrhea is constant, and is quite characteristic. The discharge is thin, purulent, and blood-streaked. Menstruation is profuse, and lasts usually from 5 to 7 days. The patient's general health suffers; she loses weight and becomes anemic, there is a sense of great reduction in physical strength. Headache is a very common symptom. Nervous, digestive, and circulatory disturbances appear sooner or later. Physical examination reveals an enlarged, tender uterus. The cervical canal is patulous; the external os is eroded. The characteristic discharge can be seen escaping from the cervix."—(*Cyclopedia of Medicine and Surgery.*)

6. There are two varieties of pelvic hematocele: (1) due to rupture of an organ, (2) due to the entrance of menstrual blood into the peritoneal cavity. The most common cause is rupture of a tubal pregnancy.

7. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ovarian cyst: Absence of the chief signs of pregnancy; there may be the characteristic facies, the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

8. *Symptoms of carcinoma of the uterus:* Presence of a tumor, pain, offensive discharge, hemorrhage, and cachexia. *Prognosis* is unfavorable, particularly after glands are involved.

9. In the case of *polypus*, the body and fundus of the uterus are in their normal position in the abdomen, a sound can be passed into the uterus, the uterine and cervical canals are not obliterated, the polypus does

not bleed easily, and is not particularly sensible to pain. The *inverted uterus* shows: Absence of body and fundus from normal position, will not permit passage of a sound into uterine cavity, the uterine and cervical canals are absent, the inverted uterus tends to bleed easily, and is very sensible to pain. In *prolapse* the largest part of the tumor is above; the opening of the Fallopian tubes cannot be seen; a sound can be passed into the uterine cavity.

Polypi of cervix. "Polypoid tumors are found growing from the mucous membrane of the cervical canal, projecting into the canal or protruding from the external os. The mucous polypus is the most usual form, and is caused by cystic degeneration of the Nabothian glands of the cervical mucous membrane. Sometimes such polypi protrude from the ostium vaginæ. Less often a papillary or warty growth is found on the mucous membrane of the cervical canal, in the neighborhood of the external os. There is usually present dilatation of the external os and cervical canal. The symptoms of cervical polypi are not characteristic. Inflammation of the cervical mucous membrane and cervical catarrh may result. There may be slight, and rarely profuse, bleeding from the externl os. The bleeding may follow efforts at straining, sexual connection, long standing, or exercise. Occurring at the time of the menopause or later, this symptom would excite the suspicion of beginning cancer of the cervix."

10. For *prolapse*, see QUESTION 9. In *rectocele*, the posterior wall of the vagina is bulged forward and downward. In *cystocele*, the anterior wall of the vagina is bulged backward and downward.

11. *The varieties of displacement of the uterus* are: Retroversion, retroflexion, anteversion, anteflexion, lateral version, lateral flexion, descent or prolapse, ascent, and mallocation (to front, back, or one side).

The following symptoms may follow displacements of the uterus: Backache, bearing-down pains, a feeling of pressure in the pelvis, constipation, hemorrhoids, frequent or painful urination, leucorrhea, menstrual disturbances, as dysmenorrhea or menorrhagia, sterility; there may also be *general symptoms*, as headache, indigestion, nausea, anorexia, neurasthenia, and general malaise.

CAUSES OF DOWNWARD DISPLACEMENTS OF THE UTERUS: (1) *Pressure from above* (pelvic or abdominal tumors, ascites, tight or heavy clothing, straining at stool, muscular exertion, fecal accumulations, habitual overdistention of the bladder); (2) *weakening and relaxation*

of the uterine supports (subinvolution, senile atrophy of pelvic floor, abnormally large pelvis, increased weight of uterus, puerperal traumatisms, pressure from above, traction from below); (3) *increased weight of uterus* (congestion, subinvolution, metritis, pregnancy, fluid in the endometrium, uterine tumors); (4) *traction from below* (vaginal cicatrices, falling of pelvic floor, contraction and congenital shortening of vagina, tumors of cervix or vagina.)—(From Dudley's *Gynecology*.)

12. "The onset of pelvic cellulitis is usually marked by a rigor, followed by pain in one or both flanks; febrile symptoms supervene, and, as the exudation increases, troubles during micturition or defecation are experienced. These signs are of greater significance when they follow within twenty-four or thirty-six hours an abortion, delivery, or an operation on the uterus. On examining through the vagina, a hard mass will be found on one or both sides of the cervix; in many cases the hard masses are conjoined by a ring of hard tissue surrounding the neck of the uterus. When the whole extent of the ligaments is infiltrated the swelling is perceptible at the brim of the pelvis and in the hypogastrium. When suppuration occurs, the temperature, pulse, and general condition of the patient are those accompanying large collections of pus. The local signs are as follows: the previously hard masses become softer, fluctuation is detected, or the overlying skin is edematous and perhaps red. The abscess is then said to point." (Sutton and Giles' *Diseases of Women*.) The *prognosis* is favorable, if proper treatment is instituted.

PATHOLOGY.

1. *Tumors of the uterus* may be: Fibroma, fibromyoma, myofibroma, adenoma, sarcoma, carcinoma, papilloma, and syncytioma malignum.

"*Fibroids*.—These tumors are the most common of those of the uterus. Although spoken of as *fibroma*, they nearly always contain a large amount of involuntary muscle, so the term fibromyoma is the more correct. They are classified according to their situation into: mural, intramural, or interstitial, when occurring within the muscular body of the uterus; submucous, when beneath the endometrium; and superitoneal, when beneath the peritoneal covering. The tumors may be single or multiple, and their size varies from a pea to one weighing fifty pounds. The largest are the subperitoneal, as their growth is practically unlimited. The density of the tumors depends upon the amount of fibrous tissue present. They are generally encap

lated. The blood-supply is poor, so degenerations are common. These usually begin in the center of the tumor, and the most frequent form is calcification. If the tumor has been a pedunculated one, the pedicle may become twisted and necrosis set in. Fibromata may be associated with lipoma, myxoma, or sarcoma.

"*Sarcoma* of the uterus usually originates within the connective tissue between the muscle-fibers and about the vessels or occasionally from the muscle cells. It may also arise within the submucous tissue. The myometrial sarcoma is generally spindle-cell in character; is grayish-white and soft; the endometrial is commonly round celled. *Angiosarcoma* is rare, and the so-called *adenosarcoma* is probably nothing more than an inclusion of the pre-existing endometrial glands.

"*Papilloma* appears on the cervix as rather small, cauliflower-like growths, composed of connective-tissue villi covered by many layers of squamous epithelium. Venereal warts are sometimes found upon the cervix.

"*Adenomata* as such occur as polypoid projections from the mucous membrane, or as a glandular hyperplasia of the endometrium. They are benign.

"*Malignant adenoma*, or *adenocarcinoma*, usually arises in the fundus of the uterus, upon the posterior wall. It is characterized by the tendency of the glands to invade the uterine muscle and by the epithelium breaking through the basement membrane. Quite frequently the epithelium proliferates so rapidly that the acini become completely filled with cells, the glandular character is lost, and the tumor assumes a typical carcinomatous structure. Metastasis is unusual; the destruction is mainly local.

"*Carcinoma* is usually an adenocarcinoma and the progress is practically similar. There is rapid infiltration with extensive ulceration. The vaginal walls and the tissues in the neighborhood of the cervix become involved. The neighboring lymphatic nodes are frequently the seat of metastases.

"*Squamous epithelioma* of the cervix is the commonest type of malignant tumor. In many cases it probably begins as a papilloma. There is soon developed a tendency of the cells to infiltrate the surrounding tissues and to grow superficially as a cauliflower-like mass. The growth extends downward, involving the vagina; extensive ulceration, accompanied at times by severe hemorrhage, occurs, and there is an extremely foul discharge. The tumor extends in all directions, and may perforate into the bladder or rectum or into the peritoneal cavity, giving rise to fatal peritonitis.

"*Syncytioma malignum*, or *chorio-epithelioma*, is a peculiar malignant tumor developing from embryonal tissue. The greater part of the cells are supposed to be derived from the syncytium. Is a rare form of growth." (McConnell's *Manual of Pathology.*)

2. *Acute yellow atrophy of the liver.* "At a very early stage the liver may be a little enlarged, but it rapidly diminishes in size, and the disease may run a fatal course in ten to fourteen days. The liver is reduced to one-half its normal size or less, the capsule is wrinkled, the consistence tough, and the color usually yellow. The outline of the lobules is not recognizable; here and there patches of liver-cells may have escaped destruction, but for the most part they are converted into a granular and fatty detritus. Numerous hemorrhages may be found in the skin, serous and mucous membranes; the urine is almost destitute of urea but contains leucin and tyrosin. The etiology of the condition, which bears considerable resemblance to phosphorus poisoning, is unknown, but it is probably infective."—(Hewlett's *Pathology.*)

3. "*Hydrocephalus* is a condition characterized by the accumulation of an increased, and often very large, amount of serous fluid within the ventricles of the brain. This condition is sometimes spoken of as internal hydrocephalus, to distinguish it from external hydrocephalus, a collection of fluid between the brain and the dura mater. This occurs in atrophy of the brain (hydrocephalus *ex vacuo*), in advanced life, and after hemorrhages, softenings, etc.

"Internal hydrocephalus may be congenital or acquired. The congenital case may be observed at birth, when the enlarged head may interfere with parturition, or it may not become apparent until the child is some months or a year old. The condition may occur in several members of the same family. The real cause is not known, although it is likely some vice of development or a fetal meningitis obstructing the foramen of Magendie and leading to the intraventricular accumulation of fluid. The acquired cases may result from an ependymitis with marked serous exudation, a condition which Quincke believes to be angioneurotic in nature (Quincke's angioneurotic hydrocephalus); or they may be due to inflammatory (meningitis) or pressure (tumor) obstruction of the passage from the third to the fourth ventricle or of the foramen of Magendie.

"In the congenital cases and those developing in early life the head may be slightly or enormously distended. The bones of the skull are separated and the

fontanelles widened; the forehead overhangs the face, the eyes are recessed, and the bones of the face seem small (ony relatively small in comparison with those of the skull). The brain is enlarged, the ventricles more or less distended, and the cortex, as a rule, correspondingly atrophied. Although rarely considerable intellectual development occurs, the mentality, as a rule, is variously impaired up to complete idiocy. Death usually occurs in childhood, but the patient may reach adult life. The cases developing in adult life can scarcely be recognized with certainty; the hydrocephalus is usually only an incident in the course of the disease to which it is due."—(Kelly's *Practice of Medicine.*)

4. *Cystocele* is a protrusion of the bladder into the anterior wall of the vagina.

Embolus is a plug of some substance blocking up a blood vessel.

Keloid is a growth occurring in scar tissue.

Lipoma is a tumor composed of fat.

Sycosis is a skin eruption involving the hair follicles, especially those of the beard.

Varicocele is a varicose condition of the veins of the spermatic cord.

Mastitis is inflammation of the breast.

Cholemia is the presence of bile in the blood.

Apoplexy is a condition resulting from hemorrhage or embolism of a cerebral vessel.

Clavus is a corn.

5. *Leukemia* is a condition in which there is a great and persistent increase in the number of white blood corpuscles. There are two varieties of the disease: (1) *Splenomedullary* in which the chief changes are found in the spleen and bone marrow; and (2) *lymphatic*, in which the chief changes occur in the lymphatic glands. It is possible for leukemia to be confounded with splenic anema and Hodgkin's disease. The diagnosis is made by an examination of the blood. In Hodgkin's disease there is either no increase in the number of the leucocytes, or a very slight increase. In *anemia*, there is a marked diminution in the number of the red blood corpuscles and there is no leucocytosis. In *splenomedullary leukemia*, there is an enormous leucocytosis, and myelocytes are present. In *lymphatic leukemia*, the lymphocytes form the main part of the leucocytosis, and there are no myelocytes.

6. *Epithelioma*, or squamous-celled carcinoma, may arise on any surface covered with stratified epithelium. It usually arises in the middle-aged or elderly, but may also occur in the young. It often results from long-

continued irritation, and may arise in old scars or ulcers. It may appear in one of three forms: (1) A wart-like growth with an indurated base; (2) a small circular ulcer with raised, rampart-like edges; (3) an indurated fissure. The growth extends to the deeper structures; the surface ulcerates and becomes foul from contamination with putrefactive organisms. The nearest lymphatic glands always become infected sooner or later, and a fatal termination occurs rapidly unless treatment is early and thorough. Secondary deposits, except in the glands, are rarer than in glandular carcinoma. The glands sometimes undergo cystic change, invade the skin, ulcerate, become foul, and may cause death by secondary hemorrhage from ulceration into large bloodvessels.

Microscopically, columns of cells are seen extending from the epithelium into the underlying tissues, and interlacing with one another. In some of the columns concentrically arranged masses of flattened, cornified cells occur, called 'cell nests.' The tissues immediately surrounding the growth are infiltrated with small round cells.—(*Aids to Surgery.*)

7. *Pathology of typhoid fever.*—"Principally inflammation of the lymphoid tissue of the lower portion of the ileum, with more or less catarrh throughout the bowels. Peyer's Patches—first week.—Are swollen through infiltration of leucocytes, the surfaces raised and fawn-colored—the infiltration involves the submucous coat. The lesions are most numerous at the lower end of the ileum. Second week.—The surface becomes abraded; sloughs form which are often bile-stained. Third week.—Sloughs come away, leaving ulcerating surfaces. Typical typhoid ulcers are thus formed. A few solitary glands undergo the same process. At the end of the week the ulcers begin to granulate, but healing is usually slow. Mesenteric glands may undergo the same changes, but more often become swollen, red, and tender only, or break down into cheesy masses. Other organs.—Spleen and liver are enlarged; heart is soft and flabby. The voluntary muscles undergo granular degeneration; in fact, similar changes to those found after death from high temperature."—(Wheeler and Jack's *Practice of Medicine.*)

8. In *mitral regurgitation*, "the most common conditions observed are more or less contraction and narrowing of the tongues of the valves, with irregular thickening and rigidity; atheroma or calcification of the segments; laceration of one or more segments; adhesion of one or more segments to the inner surface of the

ventricle; thickened and stiffened, or ruptured, chordæ tendineæ, and also contraction and hardening of the *musculi papillares*. As a result of the regurgitation or leakage of the blood back into the left auricle, there is a dilatation of the auricle, followed by slight cardiac hypertrophy. Ventricular hypertrophy occurs after a time from the increased number of the cardiac contractions. If, as is eventually the case the left auricle is unable to overcome the backward flow of blood, it dilates and the lungs become congested. The right ventricle is then forced to perform more work and hypertrophies. Hypertrophy of the right ventricle is followed by that of the left ventricle. In the event of its failure to overcome the backward flow, it (right ventricle) also dilates and the tricuspid valve becomes insufficient."—(Hughes' *Practice of Medicine.*)

9. In *chronic parenchymatous nephritis* "the kidney is larger and paler than normal. The capsule strips easily and the stellate veins are injected. On section, the cortex is larger than normal and pale; the pyramids are often conspicuous by their engorgement. The pelvis shows no increase of fat. On microscopic section, the tubules are dilated, their epithelium shows fatty changes, and they contain fatty and granular casts. The epithelium lining Bowman's capsules may be proliferated, and the capillaries and epithelium of the tuft show hyaline changes. Changes in the interstitial tissue are present, such as edema and increase of fibrous tissue."—(Woodwark's *Manual of Medicine.*)

10. *Progressive changes in gonorrheal rheumatism.* "In recent cases of this disease the structures connected with one or more of the articulations are acutely inflamed. The cavity contains a variable amount of serous effusion according to its form and size; the knee, for example, being considerably distended, while the digital joints are more moderately enlarged. The various component parts are hyperemic and swollen; and the peri-articular structures full or even edematous. In more advanced cases the joints are found to contain either sero-purulent or purulent material; the cartilages may be eroded; and finally the articulations may become completely disorganized or ankylosed. The gonococcus has been found in the intra-articular effusion. The cardiac structures are very rarely affected. The eye may present the ordinary appearances of catarrhal (not gonorrheal) conjunctivitis."—(Quain's *Dictionary of Medicine.*)

11. In *locomotor ataxia* the posterior columns of the spinal cord and the posterior nerve roots are involved.

The posterior columns of the spinal cord are gray and shrunken, and show considerable overgrowth of connective tissue in the columns of Goll, Burdach, and Lissauer; this process extends upwards from the lumbosacral region; the posterior nerve roots degenerate and become atrophic. The meninges over the affected parts become opaque and adherent. Some of the cranial nerves may also atrophy, notably the optic, but also the motor oculi and vagus.

The process is destructive and progressive; it is not a simple wasting, although the nerve fibers are atrophied, but it is characterized by irritation, changes in the axis cylinders, overgrowth of the connective tissue, and sometimes congestion; the spinal ganglia may be affected.

12. "The mode of formation of calculi has been much discussed. They may be produced by an excess of a sparingly soluble abnormal ingredient, such as cystine or xanthine; more frequently by the presence of uric acid in a very acid urine which favors its deposition. Sir William Roberts thus briefly states the conditions which lead to the formation of the uric-acid concretions; high acidity, poverty in salines, low pigmentation, and high percentage of uric acid. Ord suggests that albumin, mucus, blood, and epithelial threads may be the starting-point of stone. The demonstration of organisms in the center of renal calculi renders it probably that in many cases the nucleus of the stone is an agglutinated mass of bacteria."—(Osler's *Practice of Medicine.*)

GENERAL DIAGNOSIS.

1. *Acute appendicitis* is characterized by sudden onset of pain, at first general over the abdomen, but later localized in the right iliac fossa; tenderness, most marked at McBurney's point; rigidity of the right rectus abdominis muscle; fever; vomiting and constipation; the patient generally lies on his back with the right thigh drawn up.

In *unruptured ectopic gestation*, there is a history of irregular menstruation, morning nausea, and breast signs; the pain is of a colicky character and may cause faintness; vaginal examination shows a movable mass on one side of the uterus.

2. The *cardinal symptoms of exophthalmic goiter* are: Exophthalmus, enlargement of the thyroid gland, tachycardia and tremor. Operation should be undertaken when the disease continues to progress in spite of proper medical treatment. The dangers in operating are: Hemorrhage, sudden death from dyspnea, injury

to the recurrent laryngeal or pneumogastric nerve, and tetany.

3. *Burns of the first degree* are characterized by erythema, and local congestion of the skin; *burns of the second degree*, by vesication; and *burns of the third degree* by destruction of the skin. The possible complication of this last class are: Shock, sepsis, and ulceration of the duodenum (which may cause death from hemorrhage or perforation).

4. *Symptoms of intestinal obstruction:* Abdominal pain of an acute and severe type, constipation, vomiting which may become fecal, prostration, pallor, thirst.

In *renal colic*, the pain is agonizing, and is located in the kidney and radiates down the ureter, and may be felt in the testicle, glans penis, or inner side of the thigh; a chill is usually present; and the urine is bloody.

5. *Differential diagnosis of concussion and compression of the brain:*

	CONCUSSION.	COMPRESSION.
Onset	Sudden.	Gradual.
General condition	Can be roused.	Cannot be roused.
Pupils	Equal, react.	Dilated, immobile, perhaps unequal.
Pulse	Slow and weak.	Slow, full, heaving.
Respirations	Slow, shallow, irregular.	Slow, deep, stertorous.
Muscular system.	Relaxed (functional paralysis).	Organic paralysis.
Reflexes	Present.	Absent.
Rectum	Incontinence of feces.	Incontinence of feces.
Bladder	Incontinence of urine.	False incontinence.
Temperature	Subnormal, equal on the two sides.	Subnormal, rising in late stages; may be unequal on the two sides.

—(*Aids to Surgical Diagnosis.*)

6. Depressed fracture of the skull is frequently followed by compression of the brain.

The symptom locating it in the superior parietal region is paralysis of the muscles of the lower extremity on the opposite side of the body.

7. In *tabes dorsalis* the cardinal symptoms are: Loss of knee-jerks, lightning pains, Romberg symptom and ataxic gait, Argyll-Robertson pupil, numbness of the feet, a history of syphilis, and the slow onset of the disease.

In *multiple sclerosis*, the cardinal symptoms are: Intention tremor, nystagmus, scanning speech, exaggerated knee-jerks, ankle clonus, ataxia, rigidity in the legs, attacks of vertigo and apoplectiform and epileptiform seizures.—From Butler's *Diagnostics.*)

8. In *gangrene of the lung*, the offensive odor of the breath and the presence of lung tissue in the sputum are quite sufficient to differentiate this condition from pleuritic effusion (or anything else).

9. In *acute albuminuria* there is albumin in the urine, but none of the other symptoms of interstitial nephritis.

In *interstitial nephritis* the symptoms may be latent, but as a rule the general health is disturbed; headache, defective vision, lassitude, insomnia, dyspnea on exertion may be present. The urine may contain a little albumin or none at all, blood pressure is increased, the pulse is hard and incomprehensible, and the second aortic sound is accentuated.

10. In *acute otitis media* there is tinnitus, impaired hearing, pain (which may become intense), and fever. *Possible complications* are: Inflammation of the mastoid cells, caries and necrosis, phlebitis, meningitis, and cerebral abscess.

11. In *rabies* "the wound by which the poison was introduced, as a rule, rapidly heals, and for a time nothing happens to attract the patient's attention to the scar. In about six to eight weeks or so the scar may become painful and nervous disturbances manifest themselves. The patient becomes sleepless, peevish, irritable, and experiences a choking sensation about the throat. When the disease is fully developed there are intense muscular spasms, the respiratory muscles and those of deglutition being specially involved; but a more or less tetanoid condition may be observed in nearly all the muscles. There may be opisthotonos. The features may be horribly contorted or wear an aspect of extreme terror; the saliva is not swallowed, and as it collects in the mouth along with thick mucus from the congested fauces it causes noisy attempts at ejection, attended with great difficulty. The face is usually flushed or livid during the attacks and there may be raving delirium, delusions, and hallucinations. It should be noted that, though the patient is very thirsty, he is afraid to drink, as any attempt at swallowing brings on the

spasms at once; even the sound of running water will excite the attacks. There is generally fever, the temperature ranging from 100° to 103° F. After from two to three days the patient may pass into the "paralytic stage," which, however, is more common in animals. He generally dies of exhaustion in from two to ten days after the development of the characteristic symptoms.

Landry's paralysis "is an acute ascending paralysis beginning in the legs, rapidly involving the trunk, diaphragm, and arms, ending fatally, and probably due to a toxic affection of the lower motor neurone."—(Wheeler and Jack's *Handbook of Medicine.*)

12. *Sacro-iliac disease* is of tuberculous origin. The *symptoms* consist of pain over the joint, increased by movement or standing. From pressure on the lumbo-sacral cord, pain may be referred to the leg. The leg can be moved without pain or limitation if gentleness is exercised; but pain is produced by compressing or forcibly separating the crests of the iliac bones. There may be apparent lengthening on the diseased side from pushing downward of the iliac bone on that side. Tenderness and swelling, or even an abscess, may be felt over the joint posteriorly, or the abscess may burrow and point in the lumbar region, groin, or ischiorectal fossa.

The diagnosis from sciatica is made by the absence of pain on compressing the pelvis in sciatica.—(*Aids to Surgery.*)

BACTERIOLOGY.

1. *Microorganisms may enter the body:* (1) By the *respiratory tract,* as in pulmonary tuberculosis and whooping cough; (2) by the *digestive tract,* as in typhoid fever and cholera; (3) by the *mucous membranes* of the *genital tract,* as in gonorrhea and syphilis, and (4) by the bite of an insect (transferred to the blood) as in malaria and yellow fever.

2. *Diphtheria* is caused by the Klebs-Loeffler bacillus; *uncinariasis,* by the *Ankylostomum duodenale* and the *Necator americanus; syphilis,* by the *Treponema pallidum; erysipelas,* by the *Streptococcus erysipelatis; malaria* (*estivo-autumnal*), by *Plasmodium præcox; abscess,* by *Staphylococcus pyogenes aureus, Staphylococcus pyogenes citreus, Staphylococcus pyogenes albus, Streptococcus pyogenes, Bacillus tuberculosis,* and others; *acute osteomyelitis,* same as *abscess; purulent salpingitis,* same as abscess, with *Micrococcus gonorrhea,* and *Bacillus coli communis.*

3. *Infection* is the morbid process caused by the successful invasion of the organism by pathogenic *micro-*

organisms. The *usual symptoms* are: Malaise, chill, fever, prostration, headache, rapid pulse; other symptoms vary according to the infection.

4. *Chemotaxis* is the property by virtue of which certain living cells approach or move away from certain other living cells or substances.

Strict parasite is a parasite which cannot lead an existence independent of its host.

Saprophyte is a microorganism which grows on dead matter.

Opsonin is that quality of a serum which makes a microorganism more susceptible to phagocytosis.

Agglutinin is something in the blood serum of an animal affected with a bacterial disease which causes the clumping of the pathogenic bacteria.

Antiseptics are agents which prevent or restrain putrefaction.

Disinfectants are agents which restrain infectious diseases by destroying or removing their specific poisons.

5. *Pneumococcus* is a spherical or oval coccus, encapsulated, non-mobile, non-flagellated, non-sporogenous, non-liquefying, often occurring in pairs, non-chromogenic, aerobic and optionally anaerobic, staining readily with aniline dyes and by Gram's method; its cultural characteristics are variable, some strains growing readily on ordinary media, some with difficulty, and some not at all.

6. A sterile swab is rubbed over any visible membrane on the tonsils or throat and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appears as short thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts. *Methods of culture:* The bacillus of diphtheria grows upon all the ordinary culture media, and can be readily obtained in pure culture. Loeffler's blood serum, particularly with the addition of a little

glucose, is an admirable medium for the rapid growth of this bacillus. The medium should be alkaline and not less than 20° C.

The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella, are nonmotile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue.

7. *Difference between an antitoxin and a bacterial vaccine:* "The antitoxic sera act directly upon the poison secreted by the living bacterial cell and neutralize its toxic property, while the bacteriolytic sera affect the bacteria themselves and destroy them or paralyze their action. Since the antibacterial sera are without effect upon the formed toxin, they are mainly useful in practice as a means of protecting against the bacterial invasion, while the antitoxic sera (*e.g.* diphtheria) may be employed to combat an infection already in progress. Broadly speaking, the latter are curative, the former protective."—(Jordan's *Bacteriology.*)

Sapremia is due to absorption of toxins only, and is characterized by a persistent high temperature, relieved at once by removing the source of the poison.

Septicemia is due to organisms multiplying in the blood, and characterized by a maintained high temperature, but not relieved by getting rid of the original source.

Pyemia is due to particles of blood-clot carrying organisms to parts distant from the original source, and there setting up abscesses. It is characterized by rigors, very high temperature, sweatings, and big remissions of temperature.

8. Bacteria which most frequently cause puerperal fever, are: *Streptococcus pyogenes, Staphylococcus pyogenes aureus, gonococcus, Bacillus coli communis, Bacillus aerogenes capsulatus.*

9. *Gram's method of staining:* Stain a cover glass preparation for two or three minutes in anilin gentian-violet. Wash in water. Treat with Gram's solution (iodine, 1 gram; potassium iodide, 2 grams; water, 300 c.c.) for a minute and a half, when the preparation becomes nearly black. Decolorize with strong or absolute alcohol for at least five minutes, wash, dry, and

mount. Sometimes a contrast stain of Bismarck brown or eosin is used.

Tubercle bacillus, diphtheria bacillus, and anthrax bacillus are Gram positive; typhoid bacillus, and gonococcus are Gram negative.

10. The *bacillus of typhoid fever* is a short bacillus, with rounded ends, about 1 to 3 microns long by 0.5 to 0.8 micron wide, motile, flagellated, non-sporogenous, aerobic and optionally anaerobic, stains by carbol-fuchsin but not by Gram's method. The Widal reaction is obtained with the typhoid bacillus, a culture of which shows the phenomenon of agglutination or clumping upon the addition of dilute serum from a patient with typhoid fever.

11. A *pure culture* is one that contains only one kind of microorganism.

Five culture media: Gelatin, bouillon, blood serum, agar, and potato.

12. The *tubercle bacillus* is a small slender rod, about 3 or 4 microns long by 0.2 to 0.5 micron wide; it is non-motile, has no flagella, no spores, is aerobic, and resists acids; stains well by Ehrlich's method or by carbol-fuchsin method. The bacilli grow well on blood serum and in glycerin bouillon.

CHEMISTRY.

1. *Chemistry* is that branch of science which treats of the composition of substances, their changes in composition, and the laws governing these changes.

An *atom* is the smallest particle of an element that can enter into chemical action.

A *molecule* is the smallest quantity of any substance that can exist in a free state.

Density of a substance is the weight of a given volume of that substance as compared with the weight of an equal volume of some other substance accepted as a standard of comparison, under like conditions of temperature and pressure.

2. *Carbon* is a chemical element, with atomic weight 12, valence 4, and symbol C. It exists *free* in three allotropic forms, diamond, graphite, and coal; in *Combination* it is found in every organic compound, such as ether, chloroform, chloral, phenol, carbohydrates.

3. *Hydrocarbons* are substances which contain carbon and hydrogen only, as methane CH_4; ethane C_2H_6.

4. *Gaseous matters found in the body during health:* Hydrogen, oxygen, nitrogen, carbon, dioxide, methane.

5. Sodium chloride is a compound whose molecule

contains one atom of sodium and one atom of chlorine, NaCl. Abut fifteen grams are eliminated daily.

6. "Serum-therapy proper is the prophylactic and curative treatment of certain infectious diseases by the subcutaneous or intravenous administration of a blood-serum containing an antibody (antitoxic, bactericidal, etc.) which is specific to the particular disease. As generally used, however, the term includes also the treatment of some of these affections by vaccines and by the toxic products (toxins) of attenuated cultures of their respective microbes; but these toxins, though sometimes grown on blood-serum, may be produced on other media, and are never administered in a blood-serum, as the antibodies invariably are.

"An *Antitoxic Serum is prepared* as follows: A highly virulent culture of the specific microorganism of the particular disease, or still better, a strong toxin of tested strength prepared therefrom, is injected into the cellular tissue of a suitable animal, generally a horse, at first in very small quantity. The effect is soon shown by the onset of fever and other symptoms of acute disease, which are known as the 'reaction.' After an interval of time sufficient for recovery from these symptoms, the injection is repeated with a stronger toxin or with a culture of greater virulence, or with a larger quantity of the original toxin. This process is continued for several months, or until the animal no longer 'reacts' to the poison, and then sufficient antitoxin is presumed to exist in its blood to render it immune to the toxin and to the disease. After each inoculation the animal's blood serum is tested as to its value by experiment on guinea-pigs of definite weights. When the desired degree of immunity is reached the animal is bled from the jugular vein under strict aseptic precautions, from 6 to 12 pints being taken from a horse, according to his size and general condition. The blood is received in sterilized flasks, which are carefully stoppered and stored on ice until the clot has separated from the serum. The latter is tested to determine its value in antitoxin, has phenol added to it in the proportion of 0.5 per cent, and is bottled in vials which contain in each the dose for one patient. The vials are labeled with a statement of the number of normal antitoxin units per c.c. of the contents, expressed in multiples of a standard normal serum."—(Potter's *Materia Medica.*)

7. PIGMENTS. Of *bile:* Bilirubin, biliverdin, bilifuscin, biliprasin, bilihumin. Of *blood:* Hemoglobin,

oxyhemoglobin, hematin. Of *urine:* Urochrome, urobilin, uroerythrin, uroxanthin.

8. "In order to supply the requirements of the organism a certain amount of potential energy is needed to over-balance the amount dissipated in waste and in the production of body-heat. More potential energy is consumed during work than when the individual is at rest. The following table, computed by Rubner, shows the daily heat consumption, in units of heat (calories), in an adult, weighing 65 kilograms:

During rest in bed.....1800 calories or 28 calories per kilo.
In repose .....2100 calories or 32 calories per kilo.
In light work.....2300 calories or 33 calories per kilo.
In moderate work .....2600 calories or 40 calories per kilo.
In hard work.....3100 calories or 48 calories per kilo.

From Rubner's investigations we learn that:

1 gm. of protein = 4.1 calories
1 gm. of fat = 9.3 calories
1 gm. of carbohydrates = 4.1 calories

It has also been determined that 1 gram of alcohol equals 7 calories. In other words, the number of grams of proteins, fats, and carbohydrates required daily can be converted into their calorimetric equivalents, and inasmuch as the alimentary principles can in a degree be substituted for one another (law of isodynamics), the daily food requirements can be easily estimated in calories of heat. Thus, in order to calculate the caloric value of any food in preparing a dietary, the number of grams of proteins contained are multiplied by 4.1; the number of grams of fat by 9.3; and the number of grams of carbohydrates by 4.1; the total is then ascertained by adding. Bearing the weight of the individual in mind, a dietary can easily be constructed according to the following method:

The quantity of protein consumed daily is
100 gm. × 4.1 = 410
The quantity of carbohydrates consumed daily is
500 gm. × 4.1 = 2050
The quantity of fats consumed daily is 50 gm. × 9.3 = 465
2925

The average number of calories required daily in an individual, according to this calculation, is therefore 3000."—(Friedenwald and Ruhräh's *Dietetics for Nurses.*)

9. *Estimation of total acidity of gastric contents:* "To 10c.c. of the filtered fluid, accurately measured into a beaker, three drops of a 1 per cent solution of phenolphthalein is added, and enough $\frac{N}{10}$ NaOH solution,

accurately measured from a burette, to produce a permanent pink color. After the addition of a few cubic centimeters of the decinormal soda solution, a light rose color appears, which should not be mistaken for the end reaction. The final change of color is produced by a single drop of the alkali, and hence the addition should be made drop by drop near the end. Near the completion of the test, each drop will produce a pink-red cloud as it falls into the liquid, which will disappear on gently mixing the contents of the beaker. This is best done by giving the beaker a rotary motion."—(Bartley's *Chemistry.*)

10. First of all, test for the *albumin*, as follows: The urine must be perfectly clear. If not so, it is to be filtered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture, and again filtered. The reaction is then observed. If it be acid the urine is simply heated to near the boiling point. If the urine be neutral or alkaline it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3.

If albumin is present it should be removed. The urine is then tested for *sugar* as follows: Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

Test for *bile:* Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

Test for *Blood:* To the urine add a solution of potassium hydroxide to distinct alkaline reaction; heat nearly to boiling (do not boil). A red precipitate is produced.

11. *Ferments of the pancreatic fluid: Trypsin*, which splits up proteins into proteoses, peptones, and amino-acids: *Steapsin*, which emulsifies and saponifies fats: and *Amylopsin*, which converts starches into erythro-dextrin, achroodextrin and maltose.

12. Normal human milk consists of about 88 per cent of water and about 12 per cent of solids. These latter are approximately: proteins, 2 per cent; fats, 3 to 4 per cent; sugar, 6 per cent; and inorganic salts, about 0.3 per cent.

Cow's milk has approximately: proteins, 4 per cent; fats, 4 per cent; sugar, 4 per cent; and inorganic salts, about 0.7 per cent.

OBSTETRICS.

1. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Frequency:* About once in 1200 to 1300 pregnancies. *Symtoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

Treatment before term: Rest in bed, with or without a *tampon*, will arrest hemorrhage for the time; the sinuses are closed by thrombi, and the case may go on to term or another hemorrhage. The patient should be allowed cold drinks; opium may be used where pain is present. If the hemorrhage is great, it is safer to induce labor at once than to wait. Occasionally no hemorrhage occurs during pregnancy, not even in labor. *Treatment at term:* (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the membranes, and if there is an unfavorable presentation, turn the child and make the breech engage in the os; or, if the head presents, the forceps may be used, if speedy delivery is necessary. The strength of the woman is then the main point to be cared for, and if in a reasonable time the uterus seems to be incompetent, the child may be delivered by art. In some cases of central placenta prævia, where rapid delivery is required, cesarean section may give good results for mother and child.—(Landis' *Obstetrics.*)

2. *Prolapse of the funis* is the condition in which the umbilical cord hangs down alongside of or in front of the presenting part of the fetus. *Causes:* Malpositions and malpresentations, multiple pregnancy, sudden escape of liquor amnii, too small fetal head, too large pelvis or abdomen of mother. *Diagnosis* is made by feeling the cord through the membranes; it feels like a

soft, compressible body with pulsations which are synchronous with the fetal heart. *Danger:* Compression causes death of the fetus. *Treatment of prolapsed funis* consists in: (1) Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor; (4) speedy delivery, by forceps or podalic version.

3. *The Placenta.*—"The placenta is formed by the fusion and intergrowth of the decidua basalis, which forms the maternal portion of the placenta, and the chorion frondosum, which forms the fetal part of the placenta. As a separate organ, the placenta dates from the third month of pregnancy, and from that time gradually increases in size until the termination of pregnancy. The chorionic villi lose Langhans' layer of cells, and embed themselves into the interglandular stroma of the decidua basalis, and sometimes penetrate the mouths of the small veins. The syncytium also penetrates the endothelium of the decidual arterioles, and large blood sinuses are thus formed. By this arrangement, the fetal and maternal blood, while kept separate, are brought into such close contact that osmosis may readily occur between them, thus permitting the absorption of nutritive material from the maternal into the fetal circulation, the excretion of urea and other waste products of fetal metabolism, the passage of oxygen to the fetus, and the excretion of carbon dioxide from it.

"The *functions of the placenta* may be summed up as follows: (1) It is nutritive, allowing of the passage of nutritive material to the fetus. (2) It is respiratory. Oxygen passes to, and carbon dioxide from, the fetus. (3) It is excretory, allowing the escape of urea and other products of fetal metabolism. (4) It has a glycogenic function. Glycogen is stored in its cells for the future use of the fetus. (5) It is iron storing, by which iron in organic combination is passed from the maternal circulation into the fetal circulation to be stored in the liver cells of the fetus, in order to aid in the formation of new colored blood corpuscles.

"At full term the placenta is a discoidal mass about 7 inches in diameter, two-thirds of an inch in thickness, and weighs about 16 oz. Its fetal surface is smooth and covered by the amnion, and its maternal surface is divided by sulci into a number of irregular areas

termed cotyledons. The fetus is attached to it by the umbilical cord or funis, which averages 20 inches in length and half an inch in thickness. It consists of a stroma of Wharton's jelly, embedding the two umbilical arteries and a single umbilical vein. It is covered by the amnion."—(Lyle's *Physiology.*)

4. *Management of brow presentation:* If recognized before the onset of labor, postural treatment may be tried. This consists in placing the woman on that side toward which the fetal face is directed, so as to secure flexion of the fetal head. Failing in this, or if only recognized too late for the above to be tried, cephalic or podalic version may be attempted; or forceps may be applied, chiefly to act as a rotator. If the above do not succeed, symphyseotomy may be performed, and the child delivered by forceps. When all other methods fail, if the child is dead craniotomy is indicated.

5. OPHTHALMIA NEONATORUM. *Causes:* The gonococcus or some other pyogenic microorganism; the secretions of the mother contain the infecting agent, and transmission may occur directly during parturition, or indirectly by the fingers of physician or nurse, cloths, instruments, etc. *Symptoms:* Swollen eyelids, with copious purulent discharge; ulceration of the cornea may ensue. *Prophylaxis:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent solution of nitrate of silver, immediately after birth.

6. *Vitellus* is the germinal portion of the ovum with the substance which nourishes the embryo.

Allantois is a fetal membrane; it enters into the formation of the bladder, placenta, and umbilical cord.

Amnion is the inner of the fetal membranes.

Chorion is the outer of the fetal membranes.

7. *Eclampsia* is an acute morbid condition, occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. About 75 per cent of the cases occur in primiparæ. *Prognosis* is bad, the maternal mortality being about 30 per cent and the fetal mortality from 50 to 75 per cent. The *urine* contains albumin, is reduced in quantity, and is more toxic than normal. *Frequency,* about once in from 350 to 500 pregnancies. "*The treatment of the attack* consists of the administration of chloroform by inhalation, chloral

hydrate (gr. 60) by enema, and the fluidextract of veratrum viride hypodermically (gtt. 15 followed by gtt. ½ repeated frequently enough to keep the pulse at about 60 beats a minute), to control the convulsions, and free purgation by croton oil (gtt. 2, or 3, in sweet oil or glycerine), free sweating by the hot pack, and sometimes depletion by venesection to eliminate the poison. The after treatment consists of free purgation by the salines, restriction of diet, and later the administration of tonics and stimulants. The obstetric treatment is usually noninterference." (*Pocket Cyclopedia.*) Sometimes *accouchment forcé* is indicated.

8. *Eutocia* is normal labor, or one in which there is a vertex presentation and no complications.

Dystocia is difficult or abnormal labor, and includes all cases not carried in the term eutocia.

Varieties of dystocia: These may be classified, according to causation, as follows:

(1) *Anomalies of the expellent forces:* (*a*) Excess—precipitate labor; (*b*) deficiency—delayed or protracted labor and inertia uteri; (*c*) spasm and irregularity—rigid os and cervix, and tetanus uteri.

(2) *Anomalies of the passages:* Pelvic deformities; uterus, developmental anomalies of, atresia of cervix, rigidity of cervix, impaction of cervix, malposition, sacculation, and new growths; stenosis and rigidity of vulva and vagina; hematoma or edema of the vulva; latral abscesses and cysts; conditions of intestines or bladder; tumors and swellings of various tissues.

(3) *Anomalies of the fetus:* Malposition of the head; occipito-posterior cases; malpresentations—face, brow, pelvic, and transverse; prolapse of limbs; anomalies of fetal development—shortness of cord, unduly ossified skull, large size of fetus, death of fetus, and enlargement of head or body by disease; plural births, and monstrosities (modified from Jewett's *Practice of Obstetrics*).

9. *Hydatid pregnancy* is a pregnancy in which the chorionic villi undergo a proliferating degeneration with the production of a mass of cysts attached to the placenta. These cysts look like bunches of grapes. It occurs once in about 2,000 cases of pregnancy.

The pregnancy begins as in normal cases, but about the third month the uterus becomes suddenly and rapidly enlarged; irregular uterine hemorrhages occur; and there is a discharge of fluid containing the vesicular growths; labor occurs and the mass of cysts is expelled.

10. *Ectopic pregnancy* is a pregnancy where the fetus is being developed outside of the uterine cavity. *Varie-*

ties: It may be interstitial, tubal, ovarian, or abdominal. *Probable cause:* Some pathological condition in the Fallopian tube which obstructs the passage of the fecundated ovum. The most common condition is salpingitis, especially of the gonorrheal variety. The age at which it commonly occurs is not known. King says, "It is more apt to occur after than before thirty years of age"; Dorland says, "It is generally encountered in women who are between twenty and thirty years of age." *Symptoms of tubal pregnancy* will be signs of early pregnancy, hypogastric or inguinal pains, probable history of a previous sterility, probable expulsion of decidual membrane or shreds, softening of the cervix, enlargement of the uterus, presence of a distended tube, contractions of the wall of the gestation sac; if rupture occurs, there will be sudden, excruciating pains over the lower abdomen and on the affected side, shock, collapse, and symptoms of internal hemorrhage.

The *possible terminations* are: Rupture of the tube, followed by hemorrhage, shock, peritonitis, and perhaps death; tubal abortion, and continuance of the pregnancy to term.

11. *Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ovarian cyst: Absence of the chief signs of pregnancy; there may be the characteristic facies, the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

12. *External pelvimetry:* "The measurements are made with a pair of calipers. *Interspinous diameter:* The points of the calipers are held in the two hands so that the point of the forefinger rests alongside the point of the instrument. The two anterior superior spines are located, and the points placed on them. The calipers are then screwed tight by an assistant or nurse, and the measurement read off. Normally it is 9½ to 10 inches. *Intercristal diameter:* The instrument is

held as before and the points passed slowly round the iliac crests until the points of greatest separation are found, when the measurement is made. Normally it is 10½ to 11 inches. The *external conjugate diameter* is measured by placing the one point of the calipers over the tip of the last lumbar spine, and the other over the front of the symphysis pubis. This is most easily done with the patient standing, and the tip of the last lumbar spine can be found by counting downward from above. It is, however, usually marked by a slight dimple due to fascial attachments. In fat persons it suffices to make a point in the mid line 2½ inches above the line joining the posterior superior iliac spines. The external conjugate usually measures about 7½ to 8 inches; 3½ inches at the very least must be allowed for the thickness of the bony and soft tissues. Therefore, while a large reading may not necessarily mean a large conjugate, a reading under 7½ inches, and more especially under 7 inches, indicates that the conjugate is diminished proportionately.

"*Internal pelvimetry:* The *diagonal conjugate* from the promontory of the sacrum to the under margin of the symphysis may be measured by the fingers. The diagonal conjugate measures 4½ to 4¾ inches, and ½ to ¾ of an inch must be subtracted to give the length of the conjugate vera. The actual amount to be subtracted varies with the depth of the pubic bone and its inclination toward the sacrum, so that at the best this method of estimation is but approximately correct. In practice, however, these methods are found to be sufficiently accurate in the vast majority of cases. It should be remembered that in a normal pelvis it is impossible to touch the promontory of the sacrum by vaginal examination without forcing the fingers so far in as to hurt the patient. Therefore if the promontory can be felt readily it indicates a small pelvis and the desirability of more careful investigation. The *outlet of the pelvis* can be directly measured in both its anteroposterior and transverse diameters by means of the fingers and a measuring tape, or more conveniently by means of a pair of calipers with the points crossed."—(Johnstone's *Textbook of Midwifery.*)

TOXICOLOGY.

1. *Five emetic poisons:* Arsenic, antimony, croton oil, mercuric salts, and ptomaines.

2. The following portions of the cadaver should be preserved for analysis in cases of suspected homicide by poison: "The alimentary canal from the cardia to

the middle of the rectum, unopened, and the contents enclosed by ligatures at the esophagus, duodenum, and lower end of gut; the liver, including the gall bladder; one kidney; the spleen; a piece of muscular tissue from the leg; the brain, and any urine which may remain in the bladder. Any suspected food articles, and any obtainable vomited matter, are to be also preserved. They are to be placed in clean and new glass jars, closed with glass or cork covers or stoppers. Jars with metallic caps should never be used. Tapes or cords should be tied about the jar and cap, to which they should be attached by sealing wax bearing impressions of a seal, in such a manner that access can be had to the interior only after breaking the seals or cutting the tapes or cords. Great care must be exercised that no sealing wax can get into the jars. Each portion should be placed in a jar by itself.

"The post-mortem appearance in acute arsenical poisoning are confined to the stomach and intestines. The stomach is inflamed, whether arsenic has been taken by the mouth or by other channels of absorption. The mucous surface is coated with a layer of mucus, tinged with blood or bile, and sometimes containing white crystals of As_2O_3 or green particles of Paris green. The color of the mucous membrane is brownish red, interspersed wtih darker streaks or patches between the rugæ. The small intestines are sometimes inflamed throughout their length, but more usually the inflammation is limited to the duodenum."—(Witthaus' *Essentials of Chemistry and Toxicology.*"

3. *A reliable test for arsenic:* Reinsch's test is as follows: To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Coil up the copper, and put it into a clean dry glass tube, open at both ends, and apply heat at the part where the copper is. If arsenic is present there will appear in the cold part of the tube a mirror, which will be found on microscopical examination to consist of octahedral crystals of arsenic trioxide.

4. *The tissue changes in poisoning* by the acids mentioned are as follows:

"In *poisoning by sulphuric acid*, the postmortem appearances correspond with the amount of local injury, and this depends upon the size of the dose, state of concentration and length of time after the poison has been swallowed. Spots on the skin are white at first, but

soon become brown. The mucous membrane is white and leathery and friable. The heart is generally empty and the venous system engorged with cherry red, thick, ropy, acid blood. The stomach is generally corroded, but may only show indications of severe irritation."

"In *poisoning by nitric acid* the mucous membrane of the mouth and throat is yellow. The stomach is distended with gas, if not perforated, and patches of yellow, brown or green are seen on its internal surface. Perforation is not common."

"In *poisoning by hydrochloric acid* the appearances are much the same as from the preceding acids, but there is not so much disorganization of tissue."

"In *poisoning by carbolic acid* the mouth and throat show corrosive effects. The mucous membrane is generally white or gray and pultaceous, or it may be hardened and corrugated. The stomach usually shows relatively little corrosion. The blood is dark and fluid."—(*Riley's Toxicology.*)

5. *The symptoms of acute arsenical poisoning:* "In acute cases the symptoms usually begin in from twenty to forty-five minutes. Nausea and faintness. Violent, burning pain in the stomach, which becomes more and more intense, and increases on pressure. Persisting and distressing vomiting of matters, sometimes brown or gray, or streaked with blood, or green (Paris green). Purging. More or less severe cramps in the lower extremities." (Witthaus' *Essentials of Chemistry.*)

6. *Symptoms of acute mercurial (corrosive sublimate) poisoning:* "The nauseous, metallic taste is experienced during the act of swallowing. Within a few moments this is followed by an intense, burning pain in the mouth, throat and stomach, the mouth and tongue are whitened and shriveled. There are vomitings of a white material, containing shreds of mucous membrane and tinged with blood, and bloody stools. Salivation occurs if life be sufficiently prolonged. Death sometimes occurs early from collapse, accompanied by convulsions, or in the deep coma; but in most fatal cases life is prolonged for from three to six days." (Witthaus' *Essentials of Chemistry.*)

7. *Points to be considered in the investigation of gunshot wounds,* are: "(1) the position of the weapon, whether within the hand of the deceased, or whether it has been so placed by another; (2) the presence or absence of blood upon it; (3) the indication or not of the recent discharge of the weapon; (4) the number of cartridges or bullets discharged; (5) the caliber of the weapon; (6) the weight and dimensions of the ball dis-

charged; (7) the number, size, and direction of the wounds; (8) the presence or not of marks of violence and of blood-stains; (9) the amount of blood lost, whether clotted or not; (10) the presence or not of stains upon the clothing; (11) the direction of the effused blood; (12) the course of the wounds in the body; the presence or not of foreign substances (splinters of bone, fibers of tendon or aponeurosis) in the course of the missile; (13) the condition of the lips of the wound, whether there be inversion of the wound of entrance and eversion of the corresponding one of exit, or not; (14) the condition of the weapon, of its barrel; or if a revolver, of its different chambers; note whether they are clean or not, etc.; (15) the peculiarities, if any, of the cartridges; whether the primer is marked by the hammer, and the name of the maker, etc.; (16) the size and weight of the bullets used; (17) the weight and number, if shot were employed; (18) the condition of the sights of the weapon, whether displaced or loosened, etc.; also note the "trigger-pull," and (19) the places of impact of the various bullets, as upon the wall, etc." (Herold's *Legal Medicine.*)

8. "In addition to the hydrostatic test, *live birth* may be deduced from the following conditions: The stomach may contain milk or food, recognized by the microscope and by Trommer's test for sugar; the large intestines in still-born children are filled with meconium; in those born alive they are usually empty; the bladder is generally emptied soon after birth; the skin is in a condition of exfoliation soon after birth. The organs of circulation undergo the following changes after birth, and the extent to which these changes have advanced will give an idea of how long the child has lived: The ductus arteriosus begins to contract within a few seconds of birth; at the end of a week it is about the size of a crowquill, and about the tenth day is obliterated. The umbilical arteries and vein: The arteries are remarkably diminished in caliber at the end of twenty-four hours, and obliterated almost up to the iliacs in three days; the umbilical vein and the ductus venosus are generally completely contracted by the fifth day. The foramen ovale becomes obliterated at extremely variable periods, and may continue open even in the adult." (Murrell's *Aids to Forensic Medicine.*)

"The criminal modes for the purpose of destroying the life of the newborn child are suffocation, drowning, cold and exposure, starvation, wounds, fractures, and other injuries, luxation and fracture of the neck, poisoning, intentional neglect to ligate the umbilical cord,

causing the infant to inhale noxious gases, the introduction of instruments into various parts of the body, etc."

9. There may be marks of violence or injury on the uterus or vagina, such as perforation or tears; but there may be very few signs after the lapse of a very few days. There may be the signs of a recent delivery.

10. *Postmortem appearances in death by hanging:* "In the main they resemble those attending death from strangulation. Externally, swelling and lividity of the face, congestion of the eyelids, dilated pupils, eyes red and protruding, tongue swollen, livid, often protruded, or compressed between the teeth, lower jaw retracted; often a bloody froth escaping from the mouth and nostrils. There are frequently petechial effusions on the neck, shoulders, arms, and hands. In many cases, however, especially in suicides, the countenance is calm, the face pale, the eyes and tongue natural. Sometimes there is turgescence of the genital organs, and an involuntary escape of the urine, feces, and semen, but these signs are by no means peculiar to death by hanging. The position of the head varies according to the part of the neck where the knot was placed. As the latter is usually behind the neck, the head is generally flexed forward. If the knot were in front, the head would be found extended backward (Tardieu). The hands are generally closed, often tightly; the legs extended, and often livid. The neck is nearly always stretched, owing to the weight of the body, and it presents very decided marks of the cord, varying, however, somewhat according to the nature of the latter and its mode of application. Thus, the mark may be deep or superficial, single or double, according to the strain made upon it, and the thickness, roughness, or duplication of the cord. The skin under this mark becomes very dense and tough, and of a yellowish-brown color, and has been aptly compared to old parchment. This appearance is more marked if the body has remained suspended for some hours or days; and the cellular tissue underneath is also condensed, and has a silvery appearance. Besides the above, there is often a livid mark (ecchymosis), where great violence has been used, as in executions; but the latter is quite distinct from the true mark of the cord, with which it has been confounded. The livid line is much less frequently met with than was formerly supposed. The groove or furrow in the neck is oblique (which distinguishes it from strangulation); it may also be double (arising from a double fold of the cord), and irregular or interrupted. It is more marked in front, less so at the sides and below the ears, and ceases

behind. In general, the narrower the ligature, and the longer the suspension, the deeper the furrow. A broad leather thong, pressing only by its borders, might produce a double mark.

"Internally the appearances usually accompanying asphyxia are met with, such as engorgement of the lungs, right side of the heart, and venous system, with dark fluid blood. Both ventricles of the heart contain blood, if the death has been caused by apoplexy; if by asphyxia, the left cavities are found empty, while the right side of the heart and the large vessels are engorged with blood. The lining membrane of the larynx and trachea is deeply congested, as in strangulation, and is sometimes coated with a bloody froth, though less so than in strangulation and suffocation. The vessels of the brain are generally congested, but extravasation of blood into the brain or upon its membranes is extremely rare. The brain itself when cut into presents numerous bloody points. The kidneys are usually congested; the stomach frequently presents evidences of such deep congestion as to suggest the idea of an irritant poison. The same is true also of the intestines." (Reese's *Medical Jurisprudence.*)

11. *The signs of recent delivery:* "If the woman is examined within three days of her delivery, the followings signs will be shown: pallor of the face and general weakness will be apparent; the skin will be moist, relaxed, and soft; the eyes somewhat sunken, with a darkening beneath or surrounding them; the pulse will be soft and slightly quickened, and the breasts are knotty to the feel, and full and enlarged; the nipples are enlarged, and often exude a watery-like milk. In addition to these signs the abdomen feels soft and relaxed to the touch, and is thrown into folds; it shows on its surface numerous transverse lines, the lineæ albicantes. The uterus is readily appreciated, between the abdominal walls, being situated low down within the pelvis; it appears like a large ball. The external genitals are swollen, moist and relaxed. The vagina is rather capacious, and there is a mucopurulent discharge from the uterus. The os uteri is patulous and low, the lips thereof being somewhat soft and relaxed, and perhaps lacerated. These signs singly afford no proof of delivery, but when taken together they form conclusive evidence of the recent delivery of the woman." (Herold's *Legal Medicine.*)

12. "The kinds of food which most frequently produce symptoms of poisoning are pork, veal, beef, meat-pies, potted and tinned meats, sausages and brawn. It is

not necessary that the food should be "high" to give rise to poisoning. It may arise from the use of the flesh of an animal suffering from some disease, from inoculation with microorganisms, or from the presence of toxalbumoses or ptomaines. Many diseases such as diarrhea, enteric fever, and cholera, and perhaps tuberculosis, may be caused by eating infected foods. Trichiniasis may also be mentioned. Tinned fish often gives rise to symptoms of poisoning, and shell fish are not uncommonly contaminated with pathogenic microorganisms. Mussel poisoning was formerly supposed to be due to the copper in them derived from ships' bottoms, but it is more probably the result of the formation of a toxin during life, and not after decomposition has set in." (Murrell's *Aids to Forensic Medicine.*)

HYGIENE.

1. *Ptomaines* are basic, nitrogenous, organic compounds produced from protein material by the bacteria which cause putrefaction.

Symptoms of ptomaine poisoning: Nausea, pain in abdomen, vomiting, purging, chilliness, headache, thirst, weak and rapid pulse, anorexia, impairment of vision, muscular weakness, collapse.

The *most common source* is decomposed or infected food (meat, sausage, fish).

2. The patient must be isolated; no one but the physician and nurse must enter the room; the physician should put on a large washable gown when he goes in, and remove it on leaving, at the same time washing his hands in a disinfectant; the nurse, when she leaves the sick room should also remove her clothes and put on others, at the same time disinfecting herself. Special care must be taken during the period of desquamation. At the termination of the disease everything should be disinfected; toys, and books, etc., are better burned. And see answer to question 8.

3. The air of sewers (*"sewer gas"*) has no constant composition, and if the sewer be properly constructed, well ventilated, and sufficiently flushed, may differ but little from outside air. Much depends upon the sewage being removed quickly, or, on the other hand, being allowed to stagnate and undergo decomposition. In the latter case the air of the sewer becomes foul; oxygen is lessened, carbonic acid increased, and there is much organic matter, together with variable quantities of marsh gas, sulphuretted hydrogen, and ammonium sulphide. The exact composition of the organic matter varies, but its properties are similar to those of the organic matter

in respired air. Micro-organisms adhere to moist surfaces, and hence the air of well-constructed sewers is, on the whole, remarkably free from them, except near fresh air inlets and at junctions, where splashing occurs. Neither bacteria nor other solid particulate matters are, under ordinary circumstances, given off from quiescent liquid surfaces; but if putrefaction be allowed to occur the bursting of bubbles may recharge the air with them. . . . It is probable that pathogenic organisms are but rarely conveyed by sewer gas. Air contaminted by sewage emanations may, however, be a cause of diarrhea and other gastrointestinal disturbances, and of certain forms of sore throat. Anemia, depression, and general ill-health may result from protracted exposure to such an atmosphere. Cholera, enteric fever, pneumonia, erysipelas, puerperal fever, and diphtheria. Cholera, enteric fever, pneumonia, erysipelas, puerperal fever, and diphtheria have a much heavier incidence, both in numbers and severity, upon persons exposed to these conditions. It is not necessary to assume an origin *de novo* in such cases, or even in the case of diarrhea and sore throat, the evidence being consistent with the supposition either that the specific poison is sometimes carried by such emanations, or that their effect is merely to predispose to the disease. There is no evidence of any specific relation between sewer gas and small-pox, measles, or whooping-cough." (Whitelegge and Newman's *Hygiene and Public Health.*)

4. MEASLES. *Period of incubation:* From 7 to 18 days, oftenest 14. *Date of eruption,* third or fourth day. *Quarantine.* In contacts, 18 days; for the sick, at least that length of time, and as much longer as for the entire completion of desquamation and the subsidence of the catarrhal conditions. After release from quarantine the child should not be allowed to re-enter school for at least 5 days longer.

VARIOLA. *Period of incubation,* 9 to 15 days; most often 12 days. *Date of eruption,* usually on the fourth day. *Quarantine.* For the sick, until desquamation is complete and the skin thoroughly healed, not less than 21 days. For contacts, 14 days.

SCARLET FEVER. *Period of incubation,* usually from 2 to 4 days; occasionally 24 hours and sometimes as long as 12 days. *Date of eruption,* first or second day. *Quarantine.* For contacts, 12 days, if possible non-immunes should be isolated in another house. For convalescents, until desquamation is absolutely complete, a minimum of 21 days and a maximum of 8 weeks; with a

running ear, the child should be excluded from school much longer than 8 weeks and should under no circumstances return to school under 5 weeks. (From Gardner and Simonds' *Practical Sanitation.*)

5. *Essentials for the production and preservation of pure dairy milk:* Vaughan's rules are as follows: "(1) The cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60 deg. Fahr., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered, during the summer, in refrigerated cans or in bottles about which ice is packed during transportation. (8) When received by the consumer it must be kept in a clean place, and at a temperature some degrees below 60 deg. Fahr."

Diseases specially liable to be conveyed by the ingestion of milk: Tuberculosis, typhoid fever, scarlet fever, diphtheria, tonsilitis, cholera, and gastrointestinal disorders.

6. *Pasteurization of milk* consists in heating the milk for twenty minutes at a temperature of 140 deg. Fahr.

"*Advantages of pasteurization milk:* (1) That most, if not all, of the common bacteria and their toxins are killed. (2) That the ordinary ferments and germicidal properties of the milk are not destroyed. (3) That the process may be accomplished on a large scale, and furnish a commercially safe milk. (4) That the taste, appearance, odor, and cream separation quality of the milk are not altered. (5) That pasteurized milk, if kept cold, furnishes a clean, healthy milk, safe for infant food and other uses.

"*Disadvantages of the pasteurization of milk:* The following are some of the objections which are urged by the opponents of pasteurization upon a large and commercial basis: (1) That the spore-bearing bacteria and bacterial toxins are not destroyed, and the milk is therefore not wholly safe. (2) That pasteurization stops lactic-acid fermentation, and thus destroys the only 'nature's danger signal,' and the first symptom by which aged milk is known. (3) That unless pasteurized milk is rapidly cooled and kept under 50 deg. Fahr., certain fermentative changes which are ordinarily stopped by lactic-acid fermentation increase in activity, owing to the destruction of lactic-acid bacilli by the pasteurization. (4) That pasteurization, by preserving unclean milk for some time, may induce the producers to furnish dirty milk, discourage rigid cleanliness, and promote carelessness on the part of the producer who relies entirely on the pasteurization to preserve the milk. (5) That the pasteurization furnishes a 'purified' milk instead of a 'pure milk.' "—(Price's *Hygiene and Sanitation.*)

7. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic microorganisms. Immunity may be either natural or acquired.

Natural immunity is that power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired immunity is this resistance acquired (1) by a previous attack of the disease, or (2) by the person being made artificially insusceptible. The conditions which give immunity are: (1) a previous attack of the disease; (2) inoculation with the specific microorganisms in small numbers or of diminished virulence, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

Examples: The rat is *naturally immune* to anthrax; the white mouse is *naturally immune* to infection with *Bacillus mallei. Acquired immunity* is seen in the immunity from smallpox after vaccination, or after having suffered from an attack of the disease.

8. To prevent the spread of typhoid fever: Flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others

should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over. Further, each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food.

"When the patient has recovered from an infectious disease, he should be given a general bath with soap and water. In addition to this, he may be bathed with chlorinated soda solution, and in the exanthemata it may be advisable to anoint his body again unless all desquamation has ceased. After a general bath has been given the patient may be allowed to mingle with the well. In most localities the convalescent from certain diseases, especially smallpox, is washed with 1:2000 bichloride of mercury solution, clothed with clean clothing, and then transferred to a disinfected room.

"The clothing and bedding which are to be disinfected by means of steam should be carefully wrapped in cloths saturated with 1 per cent carbolic solution, placed in a wagon, and taken to the disinfecting station. After the bed has been stripped, all refuse matter, paper, and articles of little value are wrapped in cloths saturated with carbolic acid and burned in a stove or furnace. The floor, doors, windows, furniture, and the walls for a distance of 1½ meters from the floor should be washed with 5 per cent carbolic acid solution. The walls and ceiling of the room should subsequently be sprayed with 1:1000 bichloride of mercury solution. If the walls are papered, it is advisable to remove carefully the paper before beginning the disinfection. The room is then closed as tightly as possible and disinfected by means of formaldehyde." (Bergey's *Hygiene.*)

9. To *fumigate by chlorine:* For 1000 cu. ft. of space pour two ounces of H_2SO_4, and three ounces of water, previously mixed and cooled, upon eight ounces of NaCl and two ounces of MnO_2. The fluids must be mixed slowly and with care, and the salts should be in an earthen vessel upon a bed of sand. The generating apparatus should be as high in the room as possible, because chlorine gas is very heavy.

To *fumigate by sulphur dioxide:* For each 1000 cu. ft. of space, five pounds of sulphur are burned, care being taken to prevent accidents. In all cases, all apertures and crevices of the room should be closed, all closets, drawers, or other receptacles opened; and after the fumigation the room should be well ventilated and thoroughly cleansed with a solution of corrosive sublimate.

The room in question contains 3000 cu. ft.

10. *The requisites of a good filter* are (according to Parkes): (1) That every part shall be accessible for cleansing or renewing the medium. (2) That the filtering medium shall have a sufficient purifying power and be present in sufficient quantity. (3) That the medium gives nothing to the water favoring the growth of low forms of life. (4) That the purifying power be reasonably lasting. (5) That there be nothing in the construction of the filter itself capable of undergoing putrefaction or of yielding metallic or other impurities to the water. (6) That the filtering material shall not clog, and that the flow of water be reasonably rapid; to which may be added: 7. That the filtering medium be such that it can be readily cleansed and sterilized, or else so cheap that the removal and replenishing may not be neglected when necessary on account of the expense.

11. *The habitual use of alcohol predisposes to:* Arteriosclerosis, chronic nephritis, cirrhosis of liver and kidneys; it lowers the resisting power against bacterial invasion, hence pneumonia, tuberculosis, etc., may be included in this list. The excessive use of alcohol shortens life; the moderate use probably has no effect on longevity, but much depends on the constitution and habits of the individual.

12. *Malaria* is transmitted through the bite of an infected mosquito (*anopheles*). Individuals should use mosquito netting round their beds and wire gauze in doors and windows, so as to keep out the mosquitos as much as possible. All pools, stagnant water, etc., where mosquitos may breed, should be removed. All mosquitos, larvæ, etc., should be destroyed as far as possible. By staying indoors during dusk and darkness, opportunities for infection may be avoided. Occasional fumagation with formaldehyde or sulphur is also efficacious.

STATE BOARD EXAMINATION QUESTIONS.

West Virginia State Board of Health.

ANATOMY.

1. Describe the structures of the index finger and their relation to bone tissue.
2. Give the anatomy of the kidneys.
3. Describe the portal circulation.
4. Describe the spinal cord and give its relation to other tissues.

5. Describe Scarpa's triangle, naming the most important structures nearest it.
6. What is meant by the circle of Willis?
7. Describe fully the stomach.
8. Describe the peritoneum and name structures to which it is attached.
9. Name and give insertions and attachments of the muscles of the forearm.
10. Describe the bones of the foot and give their articulation.

PHYSIOLOGY AND HISTOLOGY.

1. Give the principal forms in which connective tissue occurs.
2. Give the histology of the spleen.
3. Describe in brief the histology of the kidney.
4. Give a brief description of the capillaries.
5. What are the fundamental groups of elementary tissue?
6. Give the function of the lymph glands.
7. What is the effect of respiration upon pulse and blood pressure?
8. Name and give function of the ferments of pancreatic juice.
9. Give function of the liver.
10. Give the conditions affecting body temperature.

CHEMISTRY AND MEDICAL JURISPRUDENCE.

1. Define chemistry, element, and molecular weight.
2. What is an acid, a base, a salt, a radical?
3. From what is iodine derived? Give symbol and atomic weight.
4. State difference between quantitative and qualitative analysis.
5. Describe the chemical changes in olive oil in the alimentary canal.
6. What is your opinion of the physician's legal responsibility?
7. What is an ordinary witness? An expert witness?
8. What is molecular death? Somatic death?
9. Name some of the ways of identifying a dead body.
10. Under what conditions would a physician be justified in producing abortion? What precautions for self protection?

MATERIA MEDICA.

1. Give rules for giving medicine to children.
2. Salol—give composition, dose, and physiological action.
3. Name three hypnotics, give doses, and state which hypnotic is safest and why.

4. Salvarsan—give method of administration and name some of its dangers.
5. Serums and vaccines—name two of each, give doses and method of use.
6. Oleum ricini—give therapy.
7. Hydrotherapy—give indications.
8. Urotropin—give therapy.
9. Mercury—give preparations and therapy.
10. Cocaine—give therapy.

PRACTICE OF MEDICINE AND PEDIATRICS.

1. Give treatment of scarlet fever and its complications.
2. Give treatment of typhoid fever and principal complications.
3. Diphtheria, diagnosis, and treatment.
4. Give the cause, symptoms, and treatment of cerebrospinal meningitis; the symptoms of tuberculous meningitis.
5. What diseases may cause occlusion of the common bile-duct?
6. Describe the normal heart sounds and state the points on the chest where each is heard with greatest distinctness.
7. Describe briefly the following diagnostic signs or tests and name the disease or diseases in which they may be found, Koplik's spots; Romberg's symptoms; Argyll-Robertson pupil; Babinski's reflex; Kernig's sign; Stokes-Adams syndrome.
8. Give cause and treatment of "summer diarrhea" in children.
9. Describe the varieties of stomatitis, giving cause and treatment.
10. What diseases are most commonly found in the right iliac region?

SURGERY.

1. Give the morphological and clinical characteristics of sarcoma and its varieties.
2. Give the differential diagnosis between a subcoracoid dislocation and a fracture of the surgical neck of the humerus.
3. Give the symptoms and treatment of a fracture of the femur, about the middle, in a young child.
4. Give the clinical history of a typical case of osteomyelitis of the tibia in a child.
5. Give the differential diagnosis of a duodenal ulcer.
6. What must the surgeon do to prevent infection in his operative work in addition to careful aseptic precautions?

7. Give the varieties and discuss the etiology of ileus.
8. Describe in detail two methods of skin disinfection, and give the reasons for each step.
9. Give the treatment of burns.
10. What wounds are likely to become infected with the tetanus bacillus, and what prophylaxis is to be practised in the treatment of such wounds?

OBSTETRICS AND GYNECOLOGY.

1. What is the etiology of eclampsia? Discuss treatment.
2. Describe method by which the diagnosis of presentation and position can be made?
3. What is the treatment of threatened, and of inevitable, abortion?
4. Describe the changes in the mucous membrane of the uterus incident to pregnancy.
5. What are the rules governing the introduction of the blades of forceps?
6. Describe phantom tumor and give treatment.
7. What is the mesosalpinx and what does it contain?
8. What is the relation of the pubococcygeus muscles to prolapsus uteri?
9. Name the organs or parts composing the vulva and give functions of each.
10. Discuss the theories of menstruation.

SPECIAL MEDICINE.

1. Conjunctivitis—give two varieties and treatment of each.
2. Glaucoma—describe and give treatment.
3. Otitis media—give causes and treatment.
4. Eustachian tube—name some of the diseases affecting it and the treatment.
5. Epistaxis—give causes and treatment.
6. Nasal catarrh (coryza)—treatment.
7. Give points at which principal heart murmurs are heard.
8. Hemorrhage from the lungs—give cause and treatment.
9. Name three curable forms of insanity and give general treatment.
10. Describe the S. Weir Mitchell rest cure.

BACTERIOLOGY AND HYGIENE.

1. Name several non-pathogenic bacteria which are useful to human life and health.
2. Name the two methods by which bacteria multiply.

and state what bearing the knowledge of this has upon the methods of surgical sterilization.

3. Name five bacteria which are or may be pyogenic, and state their relative virulence.

4. Define the following: Obligate, facultative, toxin, and chemotaxis.

5. State Koch's four laws.

6. Describe a sanitary privy.

7. Give detailed directions how to rid a town of the house-fly.

8. Enumerate the important points in school hygiene, and discuss one of them in detail.

9. What is social hygiene, and what can the physician do in the course of his professional duties to promote it?

10. Discuss oral hygiene, and give the pros and cons concerning the use of the toothbrush.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

WEST VIRGINIA STATE BOARD OF HEALTH.

ANATOMY.

1. The *index finger consists of the following structures*, beginning with the skin on the palmar surface: Skin, subcutaneous tissue and fat, the sheath of the flexor sublimis digitorum, flexor sublimis digitorum, and flexor profundus digitorum, branches of the digital arteries and nerves (from radial artery and median nerves), and the three phalanges. Behind, will be found the extensor communis digitorum and the extensor indicis, with expansions of the first lumbrical and first dorsal interosseous muscles, branches of the second and third digital nerves (from the radial), subcutaneous tissue, and skin. The tendon of the flexor sublimis digitorum divides into two slips opposite the base of the first phalanx to allow of the passage of the flexor profundus digitorum. The joints between the phalanges are provided with a capsule and anterior and two lateral ligaments; these are found next to the bones.

2. The kidneys are situated in the back of the abdominal cavity, one on each side of the vertebral column, behind the peritoneum, and extending from the eleventh rib to the second or third lumbar vertebra. The right kidney is about half an inch lower than the left one. Each kidney is about four inches long, two inches broad, and one inch thick, and weighs about four and a half

ounces. The kidneys are kept in place by their vessels, fatty tissue, and the peritoneum. The shape is characteristic. Each kidney is surmounted by the suprarenal gland, is surrounded by a capsule, and consists of a cortical and medullary portion. In the cortical portion are found the Malpighian corpuscles, which are tufts of capillaries, and are surrounded by a capsule which is continuous with the uriniferous tubule which ends in the renal papilla.

Relations of the right kidney. In front: Right lobe of liver, second part of duodenum, hepatic flexure of colon (of which the last two areas are nonperitoneal). *Behind.* Diaphragm, quadratus lumborum, psoas, fascia covering these muscles, anterior lamella of lumbar aponeurosis, ilio-hypogastric ilio-inguinal, nerves, last dorsal; first lumbar artery, pleura, last intercostal space, and twelfth rib.

Relations of the left kidney. In front: Fundus of stomach, postero-internal surface of spleen, tail of pancreas, descending colon (of which last two are nonperitoneal). *Behind:* As on right, except that left kidney, lying rather higher, lies over 11th rib.

Above each kidney is the suprarenal body.

Below each kidney is the iliac crest.

3. By the *portal circulation* is meant the capillary circulation of venous blood in the liver, between the portal and hepatic veins.

Portal circulation: "The hepatic artery and the portal vein convey blood to the liver. The artery carries arterial blood, and the vein food-laden venous blood from the walls of the alimentary canal, and from the spleen and pancreas. Both vessels enter the liver at the transverse fissure, and they ramify in its interior, breaking up into small terminal branches which run between the lobules and send fine capillary branches into their substance; from these latter branches the blood passes into the capillary tributaries of the intralobular veins, thence to the sublobular veins, and from the sublobular veins to the hepatic veins, which terminate on the posterior surface of the liver in the inferior vena cava." (Bain's *Medical Practice.*)

4. "The *spinal cord* is the elongated portion of the cerebrospinal axis contained in the spinal canal. Its length is about sixteen to eighteen inches, extending from the medulla above to the lower border of the first lumbar vertebra below, where it terminates in the cauda equina by a slender prolongation of gray substance, called the conus medullaris. It presents two enlargements, the upper or cervical, extending from

the third cervical to the second dorsal vertebra, and the lower about the position of the second or third dorsal vertebra. It is divided into two lateral halves by the anterior and posterior median fissures, united in the center by the commissure. The lateral portions are again subdivided by the antero-lateral and postero-lateral fissures into the anterior lateral and posterior lateral columns, and posteriorly a narrow fissure separates the posterior median column from the posterior median fissure. The gray substance occupies the center of the cord, and is arranged into two crescentic masses connected together by the gray commissure. The posterior horn forms the apex cornu, from which arises the posterior root of the spinal nerves. The anterior horn is thick and short, and affords origin to the anterior root of the nerves. The gray commissure contains throughout its whole length a minute canal the central canal, or ventricle of the cord, continuous above with the fourth ventricle." (Young's *Handbook of Anatomy*).

The relation of the structures in the vertebral column is (from without inward), the vertebra; venous plexus between the bone and the dura; the dura, arachnoid and pia with ligamenta denticulata; the cerebrospinal fluid; the spinal arteries and veins; the spinal cord.

5. Scarpa's triangle is a triangular area or depression situated just below the fold of the groin. It is bounded *above* by Poupart's ligament, *externally* by the Sartorius, and *internally* by the inner margin of the Adductor longus; its *apex* is formed by the junction of the Adductor longus and Sartorious. The *floor* is formed, from without inward, by the Iliacus, Psoas, Pectineus, Adductor brevis, and Adductor longus. *Contents:* The femoral vessels pass from about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it is the crural branch of the genitocrural nerve. At the apex, the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics.

6. The *circle of Willis* is an arterial anastomosis situated at the base of the brain. It is formed: In

front by the two anterior cerebral arteries (branches of the internal carotid), which are connected by the anterior communicating artery; behind, by the two posterior cerebrals (branches of the basilar artery), which are connected to the internal carotid on each side by the posterior communicating artery.

7. The *stomach* is that pouch-like portion of the alimentary canal which is situated between the esophagus and the small intestine. It is conical, with base to left side; the upper border is concave, and is called the *lesser* curvature; the lower border is convex, and is named the *greater* curvature. The left extremity is known as the *fundus*, above and to the right of which is the *cardiac* orifice, and the right or small end is termed the *pyloric* extremity. It occupies left hypochrondriac and epigastric regions. Its *orifices are cardiac*, above, communicating with the esophagus; *pyloric*, at the right extremity, passing into the duodenum. It is 10 to 12 inches long, 4 to 5 inches in diameter at widest part. Its *left* or *cardiac end* is fixed by esophagus and gastrophrenic ligament to diaphragm, lying beneath the seventh left costal cartilage, one inch from sternum; it is connected with the spleen by the gastrosplenic omentum. The *right* or *pyloric end* reaches the gall-bladder, touching under part of quadrate lobe of liver; is very movable; when stomach is empty is in midline four inches below tip of gladiolus. *Anterior surface*, which also looks upward, is in contact with, from left to right, diaphragm, abdominal parietes (epigastric region), under surface of liver. *Posterior surface* is separated from pancreas, crura of diphragm, aorta, vena cava inferior, and solar plexus, by lesser sac of peritoneum. *Superior border* is attached to liver by small omentum. *Inferior border* gives attachment to great omentum. *Coronary* and *pyloric* arteries run along lesser curvature; *right* and *left gastroepiploic*, along inferior or greater curvature; *vasa brevia*, from the splenic to fundus. *Right pneumogastric* nerve supplies the posterior surface; *left pneumogastric*, the anterior surface; *sympathetic*, from the solar plexus, both surfaces. —(*Aids to Anatomy.*)

The Mucosa "is a pale, pinkish-ash color, thickened toward the pylorus, where it presents numerous rugæ, or pleats, and at the pyloric end it helps to form the pyloric valve. It is lined throughout with columnar epithelium, and is studded with three kinds of minute tubes, the gastric follicles, and lenticular glands. The gastric follicles consist of two kinds, the pyloric and the peptic glands, the former most abundant at the pyloric end

and the latter distributed all over the surface of the stomach. The *pyloric* or *mucous glands* consist each of from two to four blind tubes opening into a common duct, and lined throughout by columnar epithelium. The *peptic glands* are similar in structure, but have a much shorter duct, and contain, in addition, peculiar large, spheroidal, granular *peptic cells*. The *lenticular* or *simple solitary glands* are small masses of lymphoid tissue scattered throughout the connective tissue framework of the stomach between the gastric follicles."—(Young's *Anatomy*.)

8. *Peritoneum. Course of, forming greater sac—in longitudinal section.*—"Passing down from the umbilicus, the peritoneum lines the anterior abdominal wall—covers the urachus and obliterated hypogastric arteries—passes onto the bladder, from its upper aspect to the trigone—is reflected onto the anterior and upper part of the lateral aspects of the rectum, in the male, forming the rectovesical pouch. In the female, the reflection is from the bladder onto the uterus (uterovesical fold)—extending thence over the upper portion of the posterior vaginal wall—and thence to the rectum (recto-vaginal pouch). From the rectum, the sigmoid flexure of the colon is entirely covered (sigmoid mesocolon)—the ascending and descending colons being covered, generally, only anteriorly and laterally—and passing from the spine downward, the peritoneum covers the small intestines, forming the lower leaf of the mesentery—and thence back again, completing the investment of the small bowel, forming the upper leaf of the mesentery—and passes backward over the transverse portion of the duodenum to the pancreas—thence forward to form the inferior layer of the transverse mesocolon—covers the inferior and part of the anterior aspect of the transverse colon—thence runs downward to form the posterior layer of the great omentum—returning to form the anterior layer of the great omentum—thence to the stomach, covering its antero-superior aspect—thence to the under surface of the liver, forming the anterior layer of the lesser or gastrohepatic omentum—thence covers the inferior surface of the liver, from the transverse fissure to its anterior border—whence it is reflected over the anterior border to cover the superior surface of the liver to the posterior peritoneal limit—thence it passes to the inferior concave surface of the diaphragm (superior layer of the coronary ligament)—thence over the anterior portion of the concavity of the diaphragm to the anterior abdominal wall—whence it passes down the anterior

abdominal parietes to the umbilicus, to the place of beginning.

Course of the Peritoneum Forming the Lesser Sac—In Longitudinal Section.—"Beginning at the posterior aspect of the stomach, which it covers, the peritoneum of the lesser sac passes upward to the inferior surface of the liver, behind the transverse fissure, forming the posterior layer of the lesser or gastro-hepatic omentum—and having covered the postero-inferior aspect of the liver, it passes on to the under surface of the diaphragm (inferior layer of the coronary ligament)—thence passes downward over the posterior portion of the concavity of the diaphragm to the spine, covering the great vessels—thence to the pancreas—thence forward, forming the upper layer of the transverse mesocolon—covers the supero-anterior aspect of the transverse colon—descends, forming the innermost layer of the great omentum—then ascends to the greater curvature of the stomach—and covers its posterior wall, to the place of beginning. The lesser sac is in relation with the inner aspect of the spleen, forming the inner layer of the gastrosplenic omentum—and also in relation with the superior portion of the left kidney."—(Bickham's *Operative Surgery.*)

9. *Muscles of the forearm:* PRONATOR RADII TERES. *Origin:* Humerus, just above the internal condyle, and inner side of coronoid process of ulna. *Insertion:* Middle of outer surface of shaft of radius.

FLEXOR CARPI RADIALIS. *Origin:* Internal condyle of humerus. *Insertion:* Base of metacarpal bone of index and middle fingers.

PALMARIS LONGUS. *Origin:* Internal condyle of humerus. *Insertion:* Palmar fascia.

FLEXOR CARPI ULNARIS. *Origin:* Internal condyle of humerus, and olecranon and upper and posterior part of ulna. *Insertion:* Pisiform bone and annular ligament.

FLEXOR SUBLIMIS DIGITORUM. *Origin:* Internal condyle of humerus, coronoid process of ulna, and oblique line of radius. *Insertion:* Second phalanges of fingers.

FLEXOR PROFUNDUS DIGITORUM. *Origin:* Upper part of anterior and inner surfaces of shaft of ulna, and from coronoid process. *Insertion:* Last phalanges of fingers.

FLEXOR LONGUS POLLICIS. *Origin:* Anterior surface of shaft of radius, and coronoid process of ulna. *Insertion:* Last phalanx of thumb.

PRONATOR QUADRATUS. *Origin:* Lower part of anterior surface of ulna. *Insertion:* Lower fourth of anterior part of radius.

SUPINATOR LONGUS. *Origin:* Upper part of external supracondylar ridge of humerus. *Insertion:* Styloid process of radius.

EXTENSOR CARPI RADIALIS LONGIOR. *Origin:* Lower part of external supracondylar ridge of humerus. *Insertion:* Metacarpal bone of index finger.

EXTENSOR CARPI RADIALIS BREVIOR. *Origin:* External condyle of humerus, external lateral ligament of elbow-joint. *Insertion:* Metacarpal bone of middle finger.

EXTENSOR COMMUNIS DIGITORUM. *Origin:* External condyle of humerus. *Insertion:* Second and third phalanges of fingers.

EXTENSOR MINIMI DIGITI. *Origin:* External condyle of humerus. *Insertion:* Second and third phalanges of fingers.

EXTENSOR CARPI ULNARIS. *Origin:* External condyle of humerus, and posterior border of ulna. *Insertion:* Metacarpal bone of little finger.

ANCONEUS. *Origin:* External condyle of humerus. *Insertion:* Olecranon and upper and posterior part of shaft of ulna.

SUPINATOR RADII BREVIS. *Origin:* External condyle of humerus, external lateral ligament of elbow-joint, orbicular ligament, and from ridge of ulna. *Insertion:* Bicipital tuberosity and oblique line of radius.

EXTENSOR OSSIS METACARPI POLLICIS. *Origin:* Outer and posterior part of shaft of ulna, and middle of posterior surface of shaft of radius. *Insertion:* Base of metacarpal bone of thumb.

EXTENSOR BREVIS POLLICIS. *Origin:* Posterior surface of shaft of radius. *Insertion:* First phalanx of thumb.

EXTENSOR LONGUS POLLICIS. *Origin:* Outer and posterior part of shaft of ulna. *Insertion:* Last phalanx of thumb.

EXTENSOR INDICIS. *Origin:* Posterior surface of shaft of ulna. *Insertion:* Second and third phalanges of index finger.

10. *Bones of foot.*—Seven tarsal (os calcis, astragalus, cuboid, scaphoid, and internal, middle, and external cuneiform); five metatarsals; and fourteen phalanges.

ARTICULATIONS. *Os calcis:* Astragalus and cuboid.

Astragalus: Tibia, fibula, os calcis and scaphoid.

Cuboid: Os calcis, external cuneiform, fourth and fifth metatarsals, and (sometimes) scaphoid.

Scaphoid: Astragalus, three cuneiform, and (sometimes) cuboid.

Internal cuneiform: Scaphoid, middle cuneiform, first and second metatarsals.

Middle cuneiform: Scaphoid, internal and external cuneiform, and second metatarsal.

External cuneiform: Scaphoid, middle cuneiform, cuboid, and second, third, and fourth metatarsals.

First metatarsal: Internal cuneiform, second metatarsal, and first phalanx of great toe.

Second metatarsal: First metatarsal, internal cuneiform, middle cuneiform, external cuneiform, third metatarsal, and first phalanx of second toe.

Third metatarsal: Second metatarsal, external cuneiform, fourth metatarsal, and first phalanx of third toe.

Fourth metatarsal: Third metatarsal, external cuneiform, cuboid, fifth metatarsal, and first phalanx of fourth toe.

Fifth metatarsal: Fourth metatarsal, cuboid, and first phalanx of little toe.

Phalanges: The first row, with the metatarsals behind, and the second row of phalanges in front; the second row of the four outer toes, with the first and third phalanges; of the great toe, with the first phalanx; the third row of the four outer toes, with the second phalanges.

PHYSIOLOGY AND HISTOLOGY.

1. The *principal varieties of connective tissue* are: Areolar, adipose, elastic, fibrous, retiform, lymphoid, cartilage, and bone. They all serve to connect and support other tissues.

2. "The *spleen* is invested by a thick capsule, consisting of fibroelastic tissue and a large proportion of visceral muscle fibers. The capsule sends trabeculæ into the interior of the organ. These are thick, and the nuclei of the muscle fibers in them stand out conspicuously in stained specimens. The bulk of the organ is deep red in color, and is called the spleen pulp. In the pulp are numerous whitish nodules, about the size of a pin's head. These nodules are composed of lymphoid tissue surrounding small arteries, and are called Malpighian corpuscles. The pulp consists of a network of fine fibers, with a number of flattened and branched cells situated on the fibers and at their crossings. In the spaces between the fibers are numerous red corpuscles, large lymphocytes, and other blood cells. Many of the red corpuscles undergo disintegration in the large lymphocytes, so that pigment, both intracellular and free, is present. An occasional giant cell of bone marrow type is seen in the spleen pulp. The splenic artery breaks up at the hilus, and the branches

pass into the interior of the organ along the trabeculæ. Passing away from the trabeculæ, their outer coat becomes surrounded at intervals by nodules of lymphoid tissue—the Malpighian corpuscles. Each corpuscle usually shows a germ center. The arteries open into capillaries, which, in turn, open into the interstices of the pulp. From the pulp spaces there open wide venous sinuses, which are encircled by fibers of the reticulum, and are lined by a very prominent endothelium. These sinuses open into the radicles of the splenic vein." (*Aids to Histology.*)

3. "The kidney is a compound, tubular gland composed of microscopic tubules whose function it is to secrete from the blood those waste products which collectively constitute the urine. If the apex of each pyramid be examined with a lens, it will present a number of small orifices, which are the beginning of the uriniferous tubules. From this point the tubules pass outward in a straight but somewhat divergent manner toward the cortex, giving off at acute angles a number of branches. From the apex to the base of the pyramids they are known as the tubules of Bellini. In the cortical portion of the kidney each tubule becomes enlarged and twisted, and after pursuing an extremely convoluted course, turns backward into the medullary portion for some distance, forming the descending limb of Henle's loop; it then turns upon itself, forming the ascending limb of the loop, reenters the cortex, again expands, and finally terminates in a spheric enlargement known as *Müller's* or *Bowman's capsule.* Within this capsule is contained a small tuft of blood-vessels, constituting the *glomerulus,* or *Malpighian corpuscle.* Each tubule consists of a basement membrane lined by epithelium cells throughout its entire extent. The tubule and its contained epithelium vary in shape and size in different parts of its course. The termination of the convoluted tube consists of a little sac or capsule, which is ovoid in shape and measures about 1/200 of an inch. This capsule is lined by a layer of flattened epithelial cells, which is also reflected over the surface of the glomerulus. During the periods of secretory activity the blood-vessels of the glomerulus become filled with blood, so that the cavity of the sac is almost obliterated; after secretory activity the blood-vessels contract and the sac-cavity becomes enlarged. In that portion of the tubule lying between the capsule and Henle's loop the epithelial cells are cuboid in shape; in Henle's loop they are flattened, while in the remainder of the tubule they are cuboid and columnar." (Brubaker's Physiology.)

4. "A *capillary* is a small vessel from 7 to 16 μ in diameter. Its wall consists of a single layer of endothelial cells. The cells are somewhat elongated in the long axis of the vessel. Their edges are serrated and are united by a small amount of intercellular substance which can be demonstrated by the silver nitrate stain. In certain capillaries those of the early embryo, of the kidney glomeruli, of the chorioid coat of the eye, of the liver, no cell boundaries can be made out. In these capillaries the endothelium appears to be of the nature of a syncytium. Capillaries branch without diminution in caliber, and these branches anastomose to form capillary networks, the meshes of which differ in size and shape in different tissues and organs. The largest meshed capillary networks are found in the serous membranes and in the muscles, while the smallest are found in the glands, as *e. g.* the liver. As to caliber, the largest are found in the liver, the smallest in muscles." (Bailey's *Histology.*)

5. The fundamental groups of elementary tissue are: Epithelial, Connective, Muscle and Nerve.

6. The *functions of the lymphatic glands and vessels* are: "(1) Mechanical, protective, or regulatory of the circulation, the serous surfaces, bursæ, tendon sheaths, the cerebrospinal fluid. (2) The absorption of digested products, the intestinal lymphatics or lacteals. (3) The formation of the blood in the thymus, bone marrow, spleen, and lymphatic glands. (4) The destruction of injurious materials in the spleen, lymphatic glands, and the lymphadenoid tissue of the respiratory tract, especially the nasopharyngeal section."—(Spencer and Gask's *Surgery.*)

7. The *pulse* is more frequent during inspiration and less frequent during expiration.

Blood-pressure rises a little with each inspiration and falls during expiration.

8. *Ferments of the pancreatic juice:* (1) *trypsin*, which changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin; (2) *amylopsin*, which converts starch into maltose; (3) *steapsin*, which emulsifies and saponifies fats; and (4) a milk-curdling ferment. All of these act in an alkaline medium only.

9. The *functions of the liver* are: (1) the secretion of bile; (2) the formation and storage of glycogen; (3) the formation of urea and uric acid; (4) the manufacture of heat; (5) the formation of creatinine; (6) the production of antithrombin; (7) the conversion of poison-

ous and harmful into inert material; (8) it is also a reservoir for blood on its way to the heart.

10. The normal body temperature is *regulated* and *maintained* by the thermotactic centers in the brain and cord keeping an equilibrium between the heat gained or produced in the body and the heat lost.

Heat is produced in the body by: (1) Muscular action; (2) the action of the glands, chiefly of the liver; (3) the food and drink ingested; (4) the brain; (5) the heart; and (6) the thermogenetic centers in the brain, pons, medulla and spinal cord.

Heat is given off from the body by: (1) The skin, through evaporation, radiation, and conduction; (2) the expired air; (3) the excretions—urine and feces.

CHEMISTRY AND MEDICAL JURISPRUDENCE.

1. *Chemistry* is that branch of science which treats of the composition of bodies, their changes in composition, and the laws governing such changes. An *element* is a substance which cannot, by any known means, be split up into other, dissimilar, substances.

Molecular weight is the weight of a molecule of a substance as compared with the weight of an atom of hydrogen.

2. An *acid* is a compound of an electro-negative element or radical with hydrogen, part or all of which hydrogen it can part with in exchange for an electro-positive element, without the formation of a base.

A *base* is a ternary compound capable of entering into double decomposition with an acid to produce a salt and water.

A *salt* is a substance formed by the substitution of an electro-positive element for part or all of the replaceable hydrogen of an acid.

A *radical* is a group of atoms which can enter or leave a chemical reaction like a single atom.

3. Iodine is derived from sea-weed. Symbol, I; atomic weight, 127.

4. By *qualitative analysis* we determine what elements or groups of elements are present in a substance.

By *quantitative analysis* we determine also the exact amounts of these elements or groups of elements.

5. Olive oil is partly emulsified, partly saponified in the intestines, its glycerin being set free and its fatty acids combining with the free alkalies to form soap, which with the emulsion forms the molecular basis of the chyle, entering the blood through the lacteals and being finally oxidized into carbon dioxide and water though an excess will appear unchanged in the urine. —*(Potter's Materia Medica.)*

6. A physician is not at all bound to accept a professional call; but if he accepts, he is bound to continue in attendance until the patient no longer requires his services, or he is discharged. He can leave during the continuance of the condition for which he was called only after giving ample notice of his intention to discontinue his services, and allowing a reasonable time for the patient to obtain the services of another physician.

The physician undertakes to use proper skill, care, and judgment in diagnosing and treating the case, and also to give full instructions as to how the patient may be best cared for. The physician is not allowed to divulge anything that he learned while in professional attendance, provided such knowledge was necessary to the successful conduct of the case.

Malpractice is a failure on the part of a medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil* malpractice. But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice*.

7. An *expert* witness may give his *opinion* on facts or supposed facts as noted by himself or asserted by others. *Theoretically*, this can only be done by one perfectly familiar with the subject in question; but *practically* any (or almost any) physician with a license to practise is accepted as an expert witness. A *non-expert* witness testifies only the *facts* which he has seen, or heard, or with which he has become acquainted by personal observation.

8. *Molecular death* is caries, or death of some cells. *Somatic death* is death of the entire body.

9. "When a body entirely unknown is found, the decision as to identity may be simplified by exclusion, so that such general questions as those of sex, race, age, height, and weight, are first settled; then with the help of the clothing, vocational stigmata, and the circumstances under which the body is found, much may be learned as to the individual and the class of life from which he came. The color, amount, and character of hair, color of eyes, the condition and number of the teeth, and general type of features, the presence of deformities, tattoo marks, and cicatrices, will, in the entire and fresh, unmutilated body, give us a basis on which to rest a thorough and complete identification.

It frequently happens, however, that bodies of unknown dead are found after the lapse of days or weeks, or, when found in water or in the woods, may be so disfigured as to make useless most of those means of identification which are most commonly used. In such instances one makes the most of those points which are at his command. When from decomposition, or for other reasons, it becomes necessary to bury or in other ways dispose of the body before identification is complete, proper photographs should be taken, and the contents of the pockets, and other possessions found on or about the body, which may assist in identification, should be retained for future reference."—(Dwight's *Medical Jurisprudence.*)

10. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of a fetus toward the end of pregnancy; (6) hydatidiform mole; (7) habitually large fetal head.

The physician should protect himself by calling in consultation another reputable physician of recognized standing.

MATERIA MEDICA.

1. *Rules for giving medicine to children:* "Never prescribe a drug without a good and sufficient reason. Prescribe so that the dose will be small in amount and as agreeable as possible. Pills and capsules are not intended for children who rarely can swallow them. Prescriptions should be simple and if possible contain but one or at most two drugs. Powders made up with sugar of milk are mixed with water and given from the teaspoon. Tablet triturates form an easy and accurate method of giving drugs (except nitroglycerin). If the child is unwilling, the medication on the spoon is quickly slipped on to the tongue and the spoon held in position well back until swallowing takes place. In this way the child cannot regurgitate it. Begin with small doses in early life and increase if the desired effect is not obtained. Heroic doses, however, may be used in emergencies where rapid and active stimulation is required. Hypodermatic injection of the stimulant is often required to produce physiological effects. The rule that an infant up to a year should receive one-twentieth of, and at one year one-tenth of the adult dose, is to be followed in the majority of cases. The stimulants, however, are exceptions to this rule. At the fifth year one-fifth, and about the tenth year one-half the adult

dosage is usually to be given."—(Chapin and Pisek's *Diseases of Children.*)

To determine the proper dosage for a child: Let x = the age of the patient; then $\frac{x}{x+12}$ = the fraction of the adult dose which the patient should receive. Thus, a patient four years old should receive $\frac{4}{4+12} = \frac{4}{16} = \frac{1}{4}$ of an adult dose.

2. *Salol* is phenyl salicylate; and is composed of 60 parts of salicylic acid, and 40 of carbolic acid. Dose, gr. vijss. Its *physiological action* is: antiseptic, antipyretic, and germicidal. Care should be exercised in its administration, because in the small intestine it is decomposed into its constituent parts, and symptoms of carbolic acid poisoning may develop.

3. *Three important hypnotics:* (1) Chloral hydrate; dose, gr. xv to xx. (2) Sulphonal; dose, gr. xv to xxv. (3) Trional; dose, gr. xv to xxv.

Indications: They are all used to produce sleep (when no pain is present).

Chloral hydrate produces a natural sleep, acts promptly, but is of no service if pain is present; it also lowers the body temperature. It can be given for a long time without deleterious effect, but it may irritate the tissues and weaken the heart.

Sulphonal produces a natural sleep, but is of slow action, requiring 3 or 4 hours to take effect; it is of no use if pain is present, does not irritate the tissues and weaken the heart, but is probably not so good for continuous use as chloral hydrate, though the two may replace each other for a time.

Trional is very similar to sulphonal but is more soluble, and acts quicker. Both sulphonal and trional are supposed to be safer than chloral.

Sulphonal is said to be safer than trional because it contains fewer ethyl groups than the latter does.

4. SALVARSAN. "It has become the regular custom to administer salvarsan *intravenously*, because in a number of instances its *intramuscular* injection was followed by necrosis and the formation of an abscess, the arsenic remaining unabsorbed. A number of deaths have occurred from its use. The untoward effects are: (1) The Jarisch-Herxheimer reaction, in which the secondary eruption becomes darker and appears to spread for a number of hours. It is believed to be the result of insufficient dosage at the outset.

(2) Irritation of the tissues, with lymphangitis, from leakage in the neighborhood of the vein.

After effects.—The usual ones are headache, nausea, malaise, lasting from twelve to twenty-four hours.—(Bastedo's *Materia Medica.*)

5. *Antidiphtheritic serum,* immunizing dose 500 units, curative dose 3,000 units; it is injected subcutaneously.

Antitetanic serum, dose 2½ to 5 drams; it is injected into the spinal cord.

Typhoid vaccine, dose 500 to 1,000 million for first dose, double this amount for second, and third doses; given hypodermatically.

Streptococcus vaccine, dose 10 to 25 million, hypodermatically.

6. COD LIVER OIL is a demulcent and emollient; it is a tissue food. It is used in tuberculosis, rheumatism, strumous diseases, rickets, nervous diseases, and wasting diseases of childhood.

7. HYDROTHERAPY. "*Cold water* or *ice* has many external applications of value in the treatment of disease. As a wet pack it is used in tonsillitis, diphtheria, and croup. Cold baths are the most effective antipyretic in the high temperature of fevers, and the cold wet pack is used for the same purpose. Ice or cold water is applied to the head in acute cerebral congestion, and to the spine in chorea, etc.; also locally in hemorrhoids, bubo, orchitis, and to the uterus in postpartum hemorrhage. Cold effusion to the body is employed as a preventive of spasmodic croup, as well as to lessen the tendency to taking cold.

"*Hot water* externally as fomentations, hot wet pack, hot baths, etc., is most effective in reducing local congestion and in setting up resolution of local inflammation. Hot fomentations to the renal region are useful in functional inactivity of the kidneys. The hot spinal douche is used in affections of the spinal cord and meninges, and in the backache of women. The hot wet pack is highly esteemed in inflammation of the chest organs, and hot injections are useful in chronic inflammation of the uterus. Hot water dressings for wounds are strongly favored by many surgeons. Vapor and Turkish baths are used as diaphoretics in advanced kidney disease, in acute and chronic rheumatism, in mineral poisoning, and in syphilis. Warm baths, with cold applications to the head, are of value in infantile convulsions and chorea."—(*Cyclopedia of Medicine and Surgery.*)

8. *Urotropin,* when taken, is decomposed in the body

and formaldehyde is liberated and eliminated in the urine; hence it is used as a urinary (and intestinal) antiseptic, dose gr. iv., administered in water.

9.

Official Preparations of Mercury	Chiefly Indicated in:
Ammoniated mercury...	Ozœna, psoriasis, tinea, and other skin affections.
Bichloride of mercury...	Syphilis, anemia, summer diarrhœa.
Calomel	Syphilis, biliousness, dropsy, dysentery.
Red oxide of mercury...	Syphilitic sores, chronic skin diseases.
Yellow oxide of mercury.	Indigestion, syphilitic sores, chronic skin diseases.
Red iodide of mercury..	Syphilis, acute tonsilitis.
Yellow iodide of mercury	Chronic Bright's disease, syphilis.
Solution of mercuric nitrate	Epitheliomata, warts, lupus.
Ointment of mercuric nitrate	Chronic skin diseases.

10. Cocaine hydrochloride. *Physiological action*: local anesthetic (externally); internally it is a muscular, cerebral, circulatory, and respiratory stimulant, also a mydriatic. Its *principal uses* are: As a local anesthetic; also in paralysis agitans, chorea, and alcoholic tremors.

PRACTICE OF MEDICINE AND PEDIATRICS.

1. *Treatment of scarlet fever and its complications.* The treatment is that of infectious fevers in general, and in addition: "1. *Serum treatment.*—Serum from convalescents, injected in doses up to 20 c.c., has sometimes proved successful. Good results have also been obtained with polyvalent antistreptococcic sera (*i.e.* sera prepared from several different strains of cocci). 2. The danger of spreading the disease is greatest during the desquamative period. Isolation must, therefore, be kept up for at least six weeks from the onset, or till all desquamation and discharges (nasal, aural, etc.) have ceased. 3. A minimum amount of nitrogenous food, to avoid irritation of the kidneys. This caution does not affect milk, which may be freely used. 4. Daily toilet, tepid sponging, or tepid baths. 5. Inunction of oily antiseptic preparations into the skin, to prevent dissemination of the desquamating scales. 6. Examine the urine daily for signs of nephritis. 7. The condition of the ears must be carefully watched. *Complications.—Arthritis* demands warm and sedative applications. Wrap the joints in cotton wool; alkalies are better than salicylates, as the latter tend to irritate the kidneys. Throat.—Ice to suck; antiseptic

sprays; glycerin of carbolic acid; warm applications externally. *For the severe types.*—Avoid caustic applications; relieve pain by cocaine solutions; internally, tincture of ferric chloride, with free administration of ammonia; quinine, either alone or with ferric chloride. Stimulants may also be required. Nasal feeding often gives much relief. *Nephritis.*—Milk diet, hydragogue purgatives (avoid mercurials), hot-air baths, hot packs, etc., according to the severity of the dropsy." —(Wheeler and Jack's *Handbook of Medicine.*)

2. *Treatment of typhoid fever with its principal complications:* The patient must be in bed, and no medicine given unless indicated. "Give no solid food, or that which would not readily pass through a fine sieve. Milk, if it agrees, albumin-water made from white of egg, beef tea, and chicken broth are the principal foods. Of late some authorities have advocated a light solid diet throughout, but nothing must be given that would increase the risk of perforation. The stools should be daily inspected. If undigested curd is found, milk is being given too often, or the gastric function is impaired. It may then be given with lime water or barley water. Beef tea should be sparingly used, lest it excite diarrhea. Alcohol is required mainly in the later stages, when the typhoid state has set in, and the heart is weak. Many cases do well without it altogether. Other stimulants are strychnine, ammonia, ether, etc.

"If the *diarrhea* becomes excessive give bismuth and opium, or lead acetate and morphia, or an enema of starch and opium. When the motions are very offensive intestinal antiseptics (calomel in small doses, salol, etc.), may be given. They are also useful in meteorism. If *constipation* be troublesome, give enemata. No purgatives should be given after the first week. *Hemorrhage*—opium, lead acetate, or calcium lactate gr. xv every four hours, hypodermic injection of morphine or ergotin, ice-bag to the cecum. *Perforation.*—The main chance of recovery lies in early laparotomy and suture of the affected bowel. Every hour lost after the diagnosis is made, and the initial shock has passed off, increases the danger to life. Cases operated on within twenty-four hours may recover; later, recovery is very rare. In anticipation of operation, morphine may be given to relieve pain and diminish peristalsis. *Bed sores*—water-bed, cleanliness, stimulant and antiseptic lotions, dry dressings if the slough is large. *High fever*—quinine and cold baths. *The antipyrin* group is dangerous to the heart.

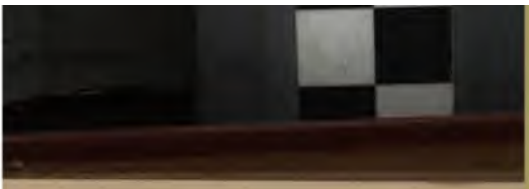
The stools and urine must be carefully disinfected. During *convalescence* the diet must be increased with the utmost caution, and the possibility of relapse must always be remembered."—(Wheeler and Jack's *Handbook of Medicine.*)

3. DIPHTHERIA. *Diagnosis* is made by finding the diphtheria bacilli in the exudate. A sterile swab is rubbed over any visible membrane on the tonsils or throat and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours:, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appears as short thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts.

Treatment includes isolation, rest in bed, liquid diet, washing of the throat and nose with an antiseptic solution, and injection of the antitoxic serum. About 5,000 units may be given at once, and another dose of half this amount in from twelve to twenty-four hours if necessary.

4. CEREBROSPINAL MENINGITIS. *Cause:* the diplococcus intracellularis meningitidis. *Symptoms:* Sudden onset, pain in back of head and neck and down the spine, opisthotonos, vomiting, convulsions, cutaneous eruption, rise of temperature, and Kernig's sign. *Treatment:* Rest in bed, quiet, warmth and stimulation, withdrawal of cerebrospinal fluid by lumbar puncture and injection of Flexner's antimeningococcic serum.

Tuberculous Meningitis.—An inflammation of the soft intracranial membranes due to the deposit of gray miliary tubercles. It is usually secondary to tuberculosis elsewhere, and is seen most often in children. The onset is usually attended with various prodromes, such as irritability, anorexia, headache, insomnia, etc. The stage of excitation is characterized by headache, vomiting, convulsions, intermittent temperature, soft, irregular, and compressible pulse, and a red line upon



drawing the finger-nail over the skin. This stage lasts for about two weeks and is followed by depression, in which the pulse is slow and compressible, temperature is depressed, and somnolence and stupor alternating with delirium, convulsions, headache, and peculiar shrieking are present. Collapse, coma, convulsions follow, and death usually results in from one day to two weeks."—(*Pocket Encyclopedia.*)

5. *Occlusion of the common bile duct may be caused by:* Gallstones, ulcers, foreign bodies, parasites, tumors in neighboring structures, aneurysms.

6. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged, the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.*

The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage.

7. *Koplik's spots* are bluish-white spots on a reddish base, found on the mucous membrane of the cheeks and lips in the pre-eruptive stage of measles.

Romberg's symptom: An ataxic patient is unable to stand steadily if his eyes are closed and his feet together; he will sway from side to side or backwards and forwards and may even fall down.

Argyll-Robertson pupil: The pupil responds to accommodation, but not to light; found in locomotor ataxia, general paralysis of the insane, cerebral syphilis.

Babinski's reflex: Irritation of the skin of the sole of the foot causes extension instead of flexion of the toes; found in lesions of the pyramidal tract, in organic (but not hysterical) hemiplegia.

Kernig's sign: The patient lies with the thighs flexed on the abdomen and the legs flexed on the thighs; if cerebrospinal meningitis is present, extension of the legs is impossible, being prevented by the contraction of the hamstrings.

Stokes-Adams syndrome: A symptom complex consisting of bradycardia, visible auricular pulsation in the veins of the neck, and vertigo or syncope; it occurs in heart-block.

8. *"Summer diarrhea in children* is a severe form of gastro-intestinal infection, due to the toxins of the bacteria in milk. It occurs in hot weather among the poor in large cities. *Treatment.* The stomach and colon should be irrigated. From 2 to 4 ounces of water at 100° F. should be allowed to flow into the stomach

through a soft rubber catheter and be siphoned out. This should be done only once. For the colon, sodium bicarbonate, ʒj, should be added to the pint, and the irrigation performed twice daily. If the rectal temperature is very high, ice cold water should be used; otherwise warm water. When symptoms of collapse appear, hot pack is used. Ice water quenches the thirst, even if it is vomited. Champagne and drop doses of brandy may be given if the stomach is tolerant. Strychnine gr. 1/100-1/48, hypodermically, to a child 1 year old, is a valuable stimulant. Morphine, gr. 1/100, and atropine, gr. 1/800, may be givevn in the same way and repeated every hour until the child is quieted.—(*Pocket Cyclopedia of Medicine and Surgery.*)

9. "*Aphthous stomatitis* is characterized by a hyperemia of the mucous membrane of the mouth, and by the formation upon it of small, yellowish white vesicles of a herpetic character. Children from 6 to 18 months of age are the most commonly affected. It is due to uncleanness, improper feeding, bad hygiene, etc. The affection is self limited, but proper feeding, regulation of the bowels, and improved hygiene should be instituted, and mouth washes containing boric acid or sodium salicylate should be used.

"*Catarrhal stomatitis* is a simple catarrhal inflammation of a portion or of the entire surface of the mouth. It occurs most commonly during the period of first dentition. It results from uncleanliness, the ingestion of irritating food, infectious fevers, gastro-intestinal disturbances, etc., the mouth is red, dry, and hot; later, there is an increased flow of saliva; coated tongue, constipation, slight fever, thirst, etc., are present. The affection lasts about one week, during which sucking is painful. The treatment consist in cleansing the nipple and the child's mouth frequently, the administration of fractional doses of calomel, and the use of mild alkaline mouth washes.

"*Gangrenous stomatitis* is a rare affection, consisting of a gangrenous destruction of the tissues of the cheek, and possibly of the adjoining structures as well. It occurs in debilitated children and follows the infectious fevers. The disease progresses rapidly and terminates in death in from a few days to two or three weeks. In debilitating affections the treatment should include strict cleanliness of the mouth to prevent this condition. After it has occurred the affected areas should be excised and tonics should be administered.

"*Parasitic stomatitis* is characterized by a catarrhal condition and by the presence on the mucous mem-

brane of white, flake like patches. It occurs usually in young infants, and is caused by a vegetable parasite (one of the mold fungi) variously known as *Oidium albicans* or *Saccharomyces albicans*. It results from uncleanliness, and the treatment is similar to that of catarrhal stomatitis.

"*Ulcerative stomatitis* is an inflammation and ulceration of the mucous membrane of the mouth, principally of the gums. It results from infantile scorbutus, infectious fevers, mercurial salivation, malnutrition, improper hygiene, etc. The symptoms include slight constitutional disturbances, reddened and swollen gums, pain and salivation, acrid, irritating and offensive saliva, foul breath, hemorrhages from the mucous membrane on pressure, etc. The treatment should first be directed toward the diet and hygiene of the patient. Salicylate of sodium, borax, or hydrogen dioxide may be used in mouth washes. Potassium chlorate should be administered internally (gr. 10-20 in 24 hours to child one year of age) and also should be used locally."—(*Pocket Cyclopedia.*)

10. *Diseases most commonly found in the right iliac region:* Inguinal hernia, psoas abscess, appendicitis, ovarian cyst or abscess, pyosalpinx, ruptured ectopic pregnancy.

SURGERY.

1. SARCOMA.—"(1) *Round-celled sarcomata* consists of a mass of round, nucleated cells with very little intercellular substance. The tumors grow rapidly, infiltrate, and disseminate. There are three varieties: (*a*) The small round-celled; (*b*) the large round-celled; (*c*) the lympho-sarcoma, in which the cells are small, but the intercellular substance consists of retiform tissue. They begin in lymphatic glands or lymphoid tissue. (2) *Spindle-celled sarcomata.*—The cells vary in size, but they are all oat-shaped, or fusiform. When much fibrous tissue is present, they are called fibro-sarcomata. Frequently patches of immature hyaline cartilage are present. (3) *Myeloid sarcomata* consist of round or spindle cells with large multinucleated cells scattered among them. The intercellular substance is gelatinous. The nuclei of the giant cells are scattered throughout, not arranged around the periphery, as in the giant cells of tubercles. They are very vascular, and may pulsate, or hemorrhage may occur in them. No secondary deposits occur, and they do not recur if completely removed. They always grow from bones, and are the least malignant. (4) *Alveolar sarcomata* are round-celled, but the cells are

grouped in alveoli by distinct stroma. (5) *sarcomata* are the most malignant. They from pigmented structures, the skin, and th The tumor consists of round or spindle cells in alveoli, the cells containing a deposit of br ment—melanin. The primary growth may slightly pigmented, and either shaped as a fla or a papilloma; but the secondary deposits a inky-black hue. Pigmented moles are the co site of origin." (*Aids to Surgery.*)

2. In *subcoracoid dislocation*, the acromion p prominent, and there is a flattening or depres low it; the head of the humerus may be felt b coracoid process, and the glenoid cavity is crepitus cannot be elicited; the head of the fixed, and adduction is impossible; as a rule preternatural immobility. In *fracture of the neck of the humerus*, the shoulder is somewha than normal; the head of the bone is in the cavity, and does not rotate with the shaft; may be obtained unless the fracture is impacte rule there is preternatural mobility of the limb.

3. *Fracture of the middle of the shaft of th in a young child. Symptoms:* "As a rule, in of the shaft of the femur the lower fragment i upward and the upper end of the lower frag found posterior and somewhat to the inside lower end of the upper fragment, and the lowe ment also undergoes external rotation (the up is due to the rectus and hamstrings; the inward is due to the adductor muscles; the outward arises from the weight of the limb). complete loss of function, the thigh and slightly flexed and usually everted. In some c leg and lower fragment are inverted. The shortening, pain on movement, preternatural m crepitus, and obvious deformity, and the ends fragments can be felt by the surgeon. In im there is alteration of the axis of the limb an shortening. Always feel for the pulse below th ture to learn if the artery is damaged.

Treatment: "Fractures of the thigh in child reduced by extension and counter-extension; padded splint reaching from the axilla to bel sole of the foot may be applied to the outer side limb and body. This splint is held in place by ages which are overlaid with plaster of Paris worn for four weeks, at which time it is remo

a plaster bandage, applied so as to include the entire limb, is worn for four weeks. Bryant's extension is very satisfactory in treating a child. Both the injured limb and the sound limb should be flexed to a right angle with the pelvis, fixed by light splints, and fastened to a bar above the bed. The weight of the body produces counter-extension and the child can be easily cleaned."—(Da Costa's *Surgery.*)

5. *Osteomyelitis* is inflammation of the bone and marrow; the term is often used now for inflammation of bone.

It is *caused* by infection, the bacteria gaining entrance either through a wound, or by extension from neighboring tissues, or they may be brought by the blood.

Symptoms: Sudden onset; pain, tenderness, fever chills, swelling of soft parts; sometimes the joint can be moved gently without pain; septicemia or pyemia may be present.

It is to be *diagnosed* from (1) *Rheumatism*, in which more than one joint is affected and the tenderness is *in* the joint, and not *near* it. (2) *Tubercular arthritis*, in which the onset is slow and the trouble starts in the epiphysis rather than in the diaphysis. (3) *Cellulitis* in which the bone and periosteum are not affected, and in which there is always a wound.

In *osteomyelitis*, the *treatment* consists in relieving the constitutional symptoms and preventing the bone from necrosing. An incision down to the bone is made; if pus is beneath the periosteum, the latter is also incised; a piece of bone is removed by chisel or trephine, pus is removed, the endosteum is hurt as little as possible, the wound is irrigated with hot bichloride solution and packed with gauze; the soft parts are closed and the wound well drained. In case this fails, amputation may be necessary.

6. In *ulcer of the duodenum* the symptoms are very similar to those found in ulcer of the stomach; but in the former condition there is less tendency to vomit, the pain does not come on till some time after food has been swallowed (and has had time to pass the pylorus), and blood in the stools is more common. All of these points are due to physiological and anatomical reasons based on the relative position of the stomach and duodenum. A special sign of duodenal ulceration is the so-called "hunger pain" which occurs at the end of digestion, when the unmixed acid of the gastric juice is passing into the duodenum. This pain is relieved by taking food, for when this occurs the pylorus

closes, and the gastric juice is for the time retained in the stomach to be mixed with the food, while the alkaline duodenal and pancreatic secretions are stimulated.

7. *Intestinal obstruction* may be caused by: Strangulation, kinking, volvulus, foreign bodies, intussusception, stricture, fecal accumulation, and tumors either within or outside the bowel.

STRANGULATION	INTUSSUSCEPTION	TWISTS (VOLVULUS)
Subjective Symptoms.	*Subjective Symptoms.*	*Subjective Symptoms.*
1. Generally occurs after age of 20.	1. Most frequent in childhood.	1. Most frequent after age of 30.
2. Pain localized, rapid collapse.	2. Constant tenesmus.	2. Pain diffuse.
3. Pain intense, paroxysmal in character.	3. Pain develops suddenly and is continuous.	3. Pain paroxysmal; recurs less often than in strangulation.
4. Constipation complete.	4. Frequent diarrhea, passage of bloody mucus.	4. Constipation complete.
Objective Symptoms.	*Objective Symptoms.*	*Objective Symptoms.*
1. Temperature often subnormal.	1. Temperature normal or subnormal.	1. Temperature slightly elevated.
2. Location in small intestine.	2. Localization in small intestine; bowel frequently protrudes at rectum.	2. Location, small intestine; abdomen often protrudes, in certain areas giving dullness on percussion.

—(*Pocket Cyclopedia.*)

8. *Two methods of skin disinfection* (*hands and forearms*): "After mechanical cleansing a germicide is employed to render the parts sterile. Whatever method is adopted it is desirable that it shall not unduly irritate the skin." *Fürbringer's Method:* After washing off the soap in sterile water the hands are dipped in 95 per cent. alcohol and held there for two or three minutes while the forearms hands, fingers, and nails are being rubbed with alcohol. Alcohol removes the soap which has entered into follicles and creases, removes desquamated epithelium, enters under and about the nails, and favors the diffusion of the corrosive sublimate under and about the nails and into the follicles, when the hands are placed later in the mercurial solution. Alcohol also hardens epithelium and keeps it from desquamating into the wound. After using the alcohol the hands are then dipped in a hot solution of corrosive sublimate (1:1000), and

with the forearms are scrubbed for at least a minute, the nails receiving especial care.

The Sublimate Alcohol Method: It is as follows: Cleanse the hands with soap and water as previously directed. Use 95 per cent. alcohol as in Fürbringer's method. Dip the hands in 70 per cent. alcohol containing 1 part to 1000 of corrosive sublimate, and rub the hands, forearms, and nails with a piece of sterile gauze wet with this fluid for three minutes. Rinse these parts in the fluid and then rinse in sterile water." —(Da Costa's *Surgery.*)

9. *Treatment of Burns.*—General: If carbonic-oxide-poisoning is present, artificial respiration and administration of oxygen. For shock, opium and stimulants. Local: For burns of the first degree, powder with boracic acid. Puncture blisters, and cover the part with an antiseptic dressing. Burns of deeper degrees than the second must be made aseptic with 1 in 1,000 perchloride of mercury. Carbolic acid is absorbed readily, and must not be used. Antiseptic gauze dressings should then be used. Picric acid (20 grains to 1 ounce of water) is used as a dressing. It lessens the pain, and can be left on two or three days. The continuous bath may be used. If the burn be of any size, it should be skin-grafted, as the scars of burns contract very much, and may produce deformities.—(*Aids to Surgery.*)

10. Punctured wounds, and those made with an implement which is dirty or which is infected with the tetanus bacillus are the most likely to result in tetanus. Such wounds should be disinfected before being dressed; and all wounds which have been exposed to infection by earth, dust or stable refuse should be thoroughly purified. The use of Antitetanic Serum has been recommended by some surgeons.

OBSTETRICS AND GYNECOLOGY.

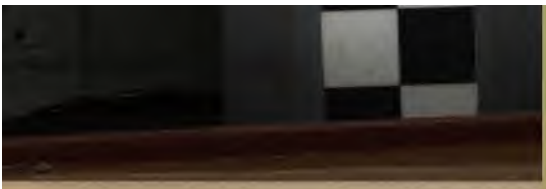
1. PUERPERAL ECLAMPSIA. *Etiology:* Urema, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease and imperfect elimination by the skin, bowels, and kidneys.

"*The prophylactic treatment* consists in frequent and regular examination of the urine. After the first appearance of albumin, daily quantitative examination of the urine should be made. The diet should be milk; the bowels should be kept freely open by means of calomel and salines; the skin should be kept active by hot baths, followed by vigorous rubbing. Diuretics,

such as Basham's mixture, digitalis, and caffein, should be administered. During pregnancy, if the percentage of albumin increases in spite of the treatment, abortion or induction of labor is indicated.

"*The treatment of the attack* consists of the administration of chloroform by inhalation, chloral hydrate (gr. 60) by enema, and the fluidextract of veratrum viride hypodermically (gtt. 15 followed by gtt. 5, repeated frequently enough to keep the pulse at about 60 beats a minute), to control the convulsions, and free purgation by croton oil (gtt. 2, or 3, in sweet oil or glycerine), free sweating by the hot pack, and sometimes depletion by venesection to eliminate the poison. The after-treatment consists of free purgation by the salines, restriction of diet, and later the administration of tonics and stimulants. The obstetric treatment is usually noninterference." (*Pocket Cyclopedia.*) Sometimes *accouchment forcé* is indicated.

2. *Methods of determining the position of the fetus prior to labor:*—"The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies,—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and, to confirm this fact, the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet, and, with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament, on either side, the fingers dip down beneath the ligament into the pelvic cavity. If the head is presenting, it is felt as a hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being often distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned. By *auscultation* the fetal heart-sounds are located, and their rate and intensity are noted. The



uterine bruit and the funic souffle are often heard. The former is a low-pitched musical murmur synchronous with the maternal heart-beat. The latter is a high-pitched whistling murmur synchronous with the fetal heart-beat. The position of the abdomen at which the fetal heart-sounds are heard with greatest intensity is of diagnostic value in confirming the find, by abdominal palpation, as to position and presentation. By *vaginal examination* the finger detects the varying portions of the fetal body which may present at the superior strait, as the cranium, the face, the shoulder, the buttocks, the knees, feet, and, exceptionally, the elbow or hand."—(Hirst's *Obstetrics.*)

3. "*Treatment of threatened abortion* includes rest in bed with absolute quiet; the administration of nerve sedatives, preferably suppositories of opium, one grain of the aqueous extract morning and evening; this may be supplemented by teaspoonful doses of the fluid extract of viburnum prunifolium four times daily. If the abortion is due to general disease, such as typhoid fever, pneumonia, phthisis, or valvular heart disease, no attempt should be made to prevent it."

Treatment of inevitable abortion: "If the preceding plan of treatment fails and abortion seems inevitable, the emptying of the uterus should be hastened.

Two methods of treatment have been advised for these cases. The first is the *expectant plan,* which may be described briefly as follows: Place the patient in bed, and if the bleeding is profuse, insert a tampon of iodoform gauze (1 yard) well up against the cervix. If this fails to control the hemorrhage, reinforce it by another yard or two of gauze and a perineal pad and binder. Small doses (3½) of the fluid extract of ergot should now be given every 2 or 3 hours. At the end of from 8 to 12 hours remove the tampon, when the ovum may be found extruded from the cervix; if not, a vaginal douche of mercuric chlorid; (1:4000) must be given, and another tampon introduced. If, upon the removal of this second tampon at the end of 10 or 12 hours, the ovum is not discharged, then more vigorous methods to secure its expulsion must be adopted.

The active plan comprises the following: The physician's hands and instruments are sterilized; the patient is etherized and placed on an appropriate table, or across the edge of the bed, her buttocks resting upon a Kelly pad; the genitalia are thoroughly cleansed and a vaginal douche of mercuric chloride (1:4000) is given; the anterior lip of the cervix is brought down to the vulvar orifice; the cervix is dilated if necessary;

the placental forceps are introduced into the uterus, and as much as possible of the ovum is removed; the uterus is thoroughly cureted, and an intrauterine douche of sterile water is given. A light tampon of iodoform gauze is placed in the vagina; the patient is then returned to bed.

A strip of gauze may be placed in the uterus in cases of sharp retroflexion, to secure free drainage, and occasionally an intrauterine tampon will be necessary when the uterus refuses to contract and hemorrhage persists after the use of the curette."—(*Pocket Cyclopedia.*)

4. "As a result of impregnation the mucous membrane of the uterus undergoes certain changes in structure, and is henceforth known as the decidua. The fertilized ovum may enter the uterus at any stage of the menstrual cycle. The surface of the endometrium may not be quite smooth, and the ovum may possibly be arrested by some ridge or projection of the surface. Here it embeds itself, and the destructive and invasive action of the syncytium is soon followed by a reaction on the part of the uterus. This reaction is characterized by a rapid transformation of the small, primitive, connective tissue cells of the stroma of the endometrium into large oval or polygonal 'epithelioid' cells with large pale oval nuclei. These are the decidual cells, and they are probably thrown out as a line of defence against the advance of the syncytium (Turner). The glands of the endometrium become enlarged and dilated, the capillaries distended with blood, and the whole membrane becomes markedly thickened and soft and edematous. Instead of being only about one-eighth of an inch thick, it swells until it may even be as much as half an inch in depth. In this growth the glands take a very active share, and increase so much in length that in order to accommodate themselves, they become folded backwards and forwards in their middle parts. The effect of this is to make the middle portion of the decidua full of distended gland spaces, whereas the more superficial portion contains only the mouths and necks of the glands supported in a stroma packed with the decidual cells. If a section be made through the decidua, it thus appears to be divided into three layers, the superficial part being compact in structure, and hence known as the superficial compact layer, while the deeper part is known as the spongy layer. The deepest part of all, immediately next the muscle wall, contains only the blind ends of the glands (many of which actually penetrate the muscle), and is

sometimes described as a third layer, the deep compact layer. For purposes of description the decidua is divided further into three parts according to its relationship to the ovum. The part on which the embedded ovum rests is called the decidua serotina; the part superficial to it is called the decidua reflexa, and the decidua lining the rest of the cavity of the uterus is called the decidua vera."—(Johnstone's *Midwifery*).

5. *Manner of using forceps:* "They should not be used when the os is undilated, when the head is not engaged, except in placenta prævia, when the membranes are unruptured, when the disproportion between the child's head and the parturient canal is too great, or in impossible positions and presentations. Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva; the tip is introduced into the vagina, passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps. In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the face is swept out under the symphysis pubis."—(*Pocket Cyclopedia.*)

6. Phantom tumor may be a "pseudocyesis," a condition in which the patient (erroneously, but honestly) believes herself to be pregnant. She may present some of the subjective signs of pregnancy, with increase in the size of the adbomen; but the cervix is unaltered, the uterus is not enlarged, and there are no fetal movements. The diagnosis is made by giving an anesthetic when the abdominal swelling diminishes in size. The difficulty lies in getting the patient to believe that she is not pregnant; perhaps the best method is for a

friend of the patient to be present during the examination under anesthesia and to witness the diminution of the swelling. No treatment is indicated.

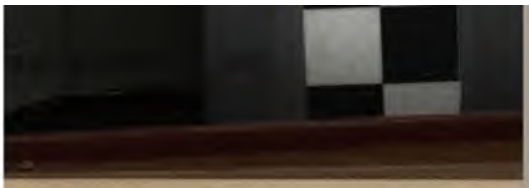
7. The *mesosalpinx* is that part of the broad ligament beneath the Fallopian tube; it consists of two layers of peritoneum with a little connective tissue, and contains the organ of Rosenmueller.

8. It was formerly believed that a ruptured perineum was the main, if not the only factor in causing a prolapse of the uterus. This is no longer accepted as true. Of course if the perineum is completely torn prolapse is more likely to occur, but the perineum is only one factor in the case. The levator ani is one of the perineal muscles, and the pubo-coccygeus is one of the divisions of the levator ani. In an ordinary perineal laceration in the median line, even if it extends into the rectum, very few fibers of the pubo-coccygeus are torn. Hence this muscle cannot be considered as having much of a causal relationship to prolapse of the uterus.

9. The *vulva* consists of the labia majora, labia minora, clitoris, hymen, vestibule, fossa navicularis, and mons Veneris. All these parts are endowed with great sensibility, and are mainly concerned with the function of coitus; in addition, the clitoris is regarded as being the main seat of sexual sensation and pleasure; the mons Veneris is said to prevent irritating secretions from the skin trickling into the vulval cleft; the hymen is a membrane closing (partially) the entrance into the vagina.

10. *Menstruation* is a periodic discharge of blood from the mucous membrane of the uterus, due to a fatty degeneration of the small blood-vessels. Under the pressure of an increased amount of blood in the reproductive organs, attending the process of ovulation, the blood-vessels rupture, and a hemorrhage takes place into the uterine cavity; thence it passes into the vagina. Menstruation lasts from five to six days, and the average amount of blood is about five ounces. It begins at puberty and occurs periodically at about 28 days interval, until the menopause; it is absent during pregnancy and early lactation.

The relation existing between ovulation and menstruation is not known. The two processes are usually coexistent, but they may be independent of each other. The following theories have been held: (1) Menstruation is dependent upon ovulation; (2) ovulation is dependent upon menstruation; (3) they are independent of each other; (4) they both depend upon some other (at present unknown) cause.



Menstruation has been considered as being analogous to the condition of "heat" or "rut" in the lower animals.

SPECIAL MEDICINE.

1. ACUTE CONJUNCTIVITIS. *Etiology:* Irritation, a foreign body, cold, exposure to strong light or heat, eyestrain, disordered secretion of tears. *Symptoms:* Hyperemia, lacrimation, epiphora, discharge, photophobia, sensation of sand in the eye, symptoms are worse in evening. *Treatment:* Remove cause if possible; use astringent and antiseptic washes; anoint the lids with vaseline; alum, tannic acid, zinc sulphate, or silver nitrate have all been recommended. When it becomes contagious, its common name is "pink-eye."

OPHTHALMIA NEONATORUM. *Causes:* The gonococcus or some other pyogenic microorganism; the secretions of the mother contain the infecting agent, and transmission may occur directly during parturition, or indirectly by the fingers of physician or nurse, cloths, instruments, etc. *Symptoms:* Swollen eyelids, with copious purulent discharge; ulceration of the cornea may ensue. *Prophylaxis:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth. *Treatment:* Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burnt.

2. *Glaucoma* is a diseased condition of the eye, produced by increased intraocular pressure, and resulting in excavation and atrophy of the optic disc, and blindness. It is due to increase of the contents of the eye, hypersecretion, retention, old age, gout, rheumatism. nephritis. *Symptoms:* Visual disturbances, increased ocular tension, hazy and anesthetic cornea, sluggish and dilated pupil, shallow anterior chamber, ciliary, neuralgia, cupping of optic disc, blindness. *Treatment:* Myotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

3. *Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a

painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the Eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided. A moderate spray of Dobell's solution may be used. If pain is present, dry heat, in the form of hot-water bottle, hot stone wrapped in flannel, etc., may be applied. A few drops (100), warmed, of a carbolic acid solution (1:40), or one of formalin (1:2000), may be instilled into the ear.

"*Acute purulent otitis media:* Acute catarrhal otitis media, instead of undergoing resolution, may pass into acute purulent otitis media (especially in exanthemata) from the passage of pathogenic germs from the nasopharynx into the middle ear. The pain will become more intense, the hearing dull; tinnitus will become louder and more distressing, and fever usually sets in. Dry heat allays the pain. Warmed water or warmed carbolic acid solution (1:40) may be used. Inflations, aspirations, etc., should be avoided. If the nares are filled with tough secretions, a spray of Dobell's solution may be used. If the pain continues over six hours in a child or over twelve hours in an adult without spontaneous perforation of the tympanic membrane, paracentesis of that structure should be performed. The concha and meatus should be smeared with petrolatum to avoid chapping, and the secretions should be gently mopped off as they appear. Under this treatment the ear usually returns to normal in two to three weeks." —(*Pocket Cyclopedia of Medicine and Surgery.*)

4. *Eustachian tube, diseases of:* Catarrh (acute and chronic) and obstruction. Cleanse the postnasal space, and inflate the Politzer bag or bougie. Dover's powder may be given at the commencement of an acute catarrhal condition.

5. EPISTAXIS. *Causes:* Ulceration, foreign bodies, anemia, cardiac hypertrophy, fracture of nose, purpura, hemorrhagic diathesis, nephritis, typhoid. *Treatment:* (1) Try to cauterize the bleeding point; (2) plug the nasal cavity with gauze soaked in adrenalin; (3) inject into the nares a solution of peroxide of hydrogen; (4) plugging the nares, anteriorly and posteriorly; (5) an inflating plug may be used.

6. The treatment of nasal catarrh consists in rest in bed, the administration of fractional doses of calomel followed by a saline, hot foot baths, hot drinks, quinine, Dover's powder, and a combination of belladonna, opium, and camphor water. The local treatment

consists in a gentle spray with an alkaline solution, and the application of a mixture of one ounce of liquid vaseline and four grains of menthol.

7. The *mitral regurgitant murmur* is heard best in the center of the mitral area, above and to the left of the apex.

The *aortic obstructive murmur* is heard best in the midsternum or to the right of it; opposite the third rib or second interspace.

The *aortic regurgitant murmur* is heard best in the midsternum opposite the upper border of cartilage of third rib.

The *mitral obstructive murmur* is heard best over the mitral area around the apex.

The *tricuspid regurgitant murmur* is heard best in the midsternum just above the ensiform cartilage.

The *tricuspid obstructive murmur* is heard best in the midsternum opposite the cartilage of the fourth rib.

The *pulmonary obstructive murmur* is heard best in the second interspace to the left of the sternum or at the level of the third rib.

The *pulmonary regurgitant murmur* is heard best in the second left interspace.

8. *Hemorrhage from the lungs* may be *caused* by:—Injury, severe coughing, purpura; it occurs in phthisis, pneumonia, abscess or gangrene or cancer of the lung, affections of the mitral valve, aneurysm. *Treatment:* "Unless a large artery is opened, bleeding usually ceases spontaneously, and the patient should be reassured. Absolute rest and quiet, light food given cold, ice to suck and injections of morphine and atropine suffice in the majority of cases. Inhalation of nitrite of amyl is a valuable measure. Ergot raises the intrapulmonary blood pressure and may do harm. In protracted cases, saline purgatives and aromatic sulphuric acid are indicated. Adrenalin is useless." —(Wheeler and Jack's *Practice of Medicine.*)

9. *Three curable forms of insanity:* Some forms of mania, melancholia, and delusional insanity.

In a general way, rest and change of environment are necessary; removal of constipation and dyspepsia is essential; sleep is beneficial, frequent bathing with friction of the skin is useful. In mania, a hot or warm bath reduces the excitement; hyoscine or chloral may quiet the patient and produce sleep; the food must be nutritious and easily digested; and the patient must be removed from his friends. A kind, but firm and judicious nurse is invaluable.

10. "The *'Weir Mitchell' treatment* is a systematized plan by which the weakened body is placed in thorough condition, by means of continuous rest, enforced feeding, and regular muscular waste produced by massage, which enables food to be taken and assimilated. The essentials of this method are:

(1) Complete rest, the patient being placed in bed, and kept there during treatment; and it should be a *sine qua non* that this rest should not be in the patient's own house, but in a medical home or in lodgings, the friends and relatives, whose influence is often most injurious, being strictly excluded.

(2) Regular muscular exercise to produce tissue-waste, by means of massage of the whole body, at first for ten minutes or a quarter of an hour, twice daily, soon increased to an hour or an hour and a half. The influence of this is often misunderstood, and this treatment is frequently erroneously talked of as a 'massage treatment.' It should be borne in mind that massage is nothing more than a remedial agent, used for a specific purpose; that it is not the most important part of the cure; and that, used alone, and without enforced rest and over feeding, as is unfortunately so often done, it cannot possibly be productive of any real good.

(3) Feeding is the most essential part of the treatment. At first the patient should be placed on milk alone, about five ounces every third hour. Within a few days this is increased to ten ounces, so that at least two quarts are taken in twenty-four hours. Then, by degrees, solid food is added, so that within a fortnight the patient should be taking three large mixed solid meals daily, in addition to the milk, and often a cup of strong soup, with two teaspoonfuls of beef peptonoids added, twice daily as well. This exaggerated diet is continued for six weeks or two months, when it is gradually lessened, the massage also being discontinued, and the patient allowed to get up. In an average case the patient should gain from fourteen to twenty-three pounds during this time. It is strange to see how, with returning health, all invalid habits are lost, sleep becomes regular without drugs, the bowels cease to require assistance, and the whole appearance, and apparently even the nature, of the patient is altered.

At the end of the treatment, in most cases, it is advisable that the patient should go for a change, either on a sea voyage or abroad, so as to complete the cure. At any rate, she should not return to her family until her health is re-established. The essential point to re-

member is that no half measures should be permitted: if this treatment is not carried out thoroughly and completely, it had much better not be tried at all."—(Quain's *Dictionary of Treatment.*)

BACTERIOLOGY AND HYGIENE.

1. *Clostridium pasteurianum; Nitroso-bacteria; Nitrobacteria;* various bacteria of the genera. *Thiothrix, Chromatium, Spirillum, Monas, Crenothrix, Cladothrix, Leptothrix; Bacterium aceti; B. pasteurianum; Bacillus chauvæi; Saccharomyces cerevisiæ.*

2. Bacteria multiply by fission (or division), and also by spore-formation. Spores are much more resistant to heat than the bacteria without spores. Hence the process of fractional sterilization is adopted by the surgeon. Sterilization on the first day kills all the non-spore forms, while the spores remain alive. The next heating kills such spores as have assumed the non-spore form. The third heating probably kills the remainder.

3. *Five pyogenic bacteria.—Streptococcus pyogenes, Staphylococcus pyogenes aureus, Staphylococcus pyogenes citreus, Staphylococcus pyogenes albus, Micrococcus tetragenus.*

4. An *obligate aerobe* is a bacterium that can only exist in the presence of oxygen; an *obligate anaerobe* is one that can only exist in the absence of oxygen.

A *facultative aerobe* or *anaerobe* is one that can exist either with or without oxygen.

A *toxin* is the poisonous product of bacteria.

Chemotaxis is the property by virtue of which certain living cells approach (*positive chemotaxis*) or move away from (*negative chemotaxis*) certain other cells or substances.

5. KOCH'S FOUR LAWS. To *prove that bacteria causes disease* it is essential: (1) That the microorganism be found in the tissues, blood, or secretions of a person or animal sick or dead of the disease; (2) the microorganism must be isolated and cultivated from these same sources; it must also be grown for several generations in artificial culture media; (3) the pure cultures, when thus obtained, must, on inoculation into a healthy and susceptible animal, produce the diseases in question, and (4) the same microorganisms must again be found in the tissues, blood, or secretions of the inoculated animal.

6. *A sanitary rural privy* consists of a "small watertight pit, not drained but roofed over to exclude rain, and so arranged that the excreta and ashes become

thoroughly mixed. For this purpose either the ashes must be thrown in through the closet seat, which may be hinged so as to be lifted *en masse*, or else a "shoot" or sloping slab must conduct one and the other to a common point. The floor should be smooth, and raised a few inches above the level of the adjoining ground.

"The contents ought to be removed at fixed short intervals, and the work should be done at night or early in the morning so as to minimize the nuisance."—(Whitlegge and Newman.)

7. "Since flies breed only in filth, the first thing to do is to render it impossible for the fly to reach any of the accumulations unavoidable around habitations. This is done: (1) By destroying filth wherever found. (2) By rendering it distasteful or poisonous to flies or their larvæ by the use of lime, kerosene, oil of pennyroyal or cresol. (3) By excluding light from the receptacle or by screens which the flies cannot pass. The most difficult part of an anti-fly campaign is teaching the people to dispose of their garbage properly. No amount of screening, trapping or poisoning, will make up for careless disposal of filth and waste. All such materials must be promptly destroyed or buried. If a really good suspension of milk of lime (calcium hydrate) is mixed with the garbage or refuse, the eggs and pupæ or maggots of the fly are at once destroyed, but it must be made to come in contact with the eggs or maggots to do any good. Kerosene oil is more effective, but more expensive. Where crude oil or low grade distillates are procurable, the expense is much lessened. Oil of pennyroyal, in the proportion of 1 ounce to 1 quart of kerosene, is very distasteful to the adult fly, as well as fatal to the young, and a small quantity sprinkled around the garbage can is sufficient to keep away all flies. The greatest drawback is the expense. Cresol is not expensive, and may be used freely in 2 per cent. emulsion. Privy vaults, manure bins, and similar places must be made and kept perfectly dark. Screens must be made automatically self-closing, otherwise they are sure to be left open and to fail of their object."—(Gardner and Simond's *Practical Sanitation*). Fly poisons, flytraps and fly papers may also be used.

8. *Concerning schools:* The school building should be as near as possible to the center of the area which it is to serve; the site should be airy and open, of sufficient size, free from swamps, and somewhat elevated; it should not be too near factories, busy streets, or railways; the soil should be as free as possible from

organic matter. The buildings should be so planned that the corners look towards the four points of the compass. In this way the sun will have access to each side and to every room during some part of the day. The building should have as few stories as possible. The walls should be of brick or stone, and should be pointed with cement; the inner surface of the wall should be cemented smooth. The foundations must be solid. The general arrangement will depend upon size of site, number of scholars, and number of required rooms. Fifteen square feet per child should be allowed. Details will have to be considered on: plans, accommodations to be provided, shape and size of class rooms, distribution of rooms, teachers' rooms, corridors, entrances and staircases, playground, ventilation, heating, lighting, and placing of windows, sanitation, lavatories, water supply, drinking water, sewage disposal, removal of refuse, sanitary appliances, and drainage. Special care must be given to the prevention of contagious diseases and the exclusion of all possible sources of infection or contagion; there should be physical examination of children, also, for non-contagious physical defects.

The principal means of preventing the spread of contagious diseases in schools are: Regular and efficient inspection by physicians; prompt exclusion and isolation of any one suffering from a contagious disease, or coming from a house where such disease is; compulsory notification of all infectious and contagious diseases; individual towels, drinking vessels, and other implements; children who have had a contagious or infectious disease or who have come from a house where such disease prevailed should not be readmitted to school until sufficient time has elapsed since the occurrence of the last case to insure safety.

9. *Social hygiene* is a term with no exact meaning, but which is often euphemistically applied to venereal prophylaxis—the prevention and control of venereal diseases. The physician can advise parents about the proper supervision of their children's leisure, amusements, companionships, and tendencies; he should urge physical exercise upon such as need it, but are disinclined to take it. He can recommend the adaptation of schooling and vocational training to the child's nervous system. He can suggest to the parents instruction in the basic facts of sex as the child attains to puberty, and in the venereal perils thereafter. Upon request, he should himself undertake this instruction. He should employ every legitimate means to insure that

venereal patients under his care do not marry until they are cured, impressing upon them the seriousness of the consequences if they disregard this advice.

10. The mouth and teeth should receive especial attention in the way of cleanliness. The hygiene of the mouth is of the first importance and may be a means of preventing disease. The teeth should be cleansed with a brush of suitable size, having bristles neither too hard nor too soft, and a handle bent at such an angle with the bristles that the latter may be able to reach all the surfaces of the teeth; the bristles should be of unequal length, and the brush must be kept clean. An improper brush, with bristles either too hard or dirty, may do harm, and has been held responsible for pyorrhœa alveolaris; but a suitable tooth-brush can effect nothing but good. The mouth and teeth should be cleaned morning and night, and if possible, after meals. In this way particles of food may be removed, fermentation checked, decay prevented, bad breath prevented or lessened, and dyspepsia warded off.

STATE BOARD EXAMINATION QUESTIONS.

College of Physicians and Surgeons of Ontario.

MEDICINE.

1. Endocarditis. Discuss the types, etiology, morbid anatomy, and clinical manifestations.

2. Cirrhosis of the liver. Enumerate varieties, and discuss the pathology, symptoms and treatment.

3. Diabetes mellitus. Describe the mode of onset and urinary findings, and discuss in detail your treatment.

4. Discuss the cause, and describe the prodromal symptoms, course, and treatment of a case of typhoid fever.

5. Discuss the etiology, and describe the lesions and mode of treatment of: Impetigo contagiosa, Herpes zoster, Alopecia areata.

SURGERY.

1. (*a*) What symptoms differentiate a malignant from a non-malignant tumor of the breast? (*b*) What course would you adopt in doubtful cases? (*c*) Describe the operation for complete removal of the breast.

2. (*a*) How is intussusception produced? (*b*) Give symptoms. (*c*) Give treatment.

3. (*a*) Describe a method for amputation in the middle of the forearm. (*b*) Enumerate the structures divided.

4. (*a*) Give the differential diagnosis between anal fissure, hemorrhoids and carcinoma of the rectum. (*b*) Give the treatment of each.

5. (*a*) Give the differential diagnosis between malignant disease of the esophageal and pyloric ends of the stomach. (*b*) Give treatment in each case.

OBSTETRICS AND GYNECOLOGY.

1. Give the management of a case of pregnancy up to the advent of labor, and also from the delivery of the placenta to the end of the puerperium, in a normal case.

2. Pains: Define the following:—True, false, weak, cutting, atonic, expulsive, after.

3. Forceps and pituitrin: What are the indications, and the contraindications, for the use of each?

4. A woman's abdomen is enlarged from the pelvis to the level of the umbilicus. Mention the conditions which may produce such an enlargement. How would you make a differential diagnosis of them?

5. Prolapsus uteri; give causes, symptoms, and treatment, operative, and non-operative.

MEDICINE.

Answer five questions only.

1. Describe the clinical course of an average case of acute lobar pneumonia terminating favorably, giving the usual physical signs noted over affected lung at various stages of progress.

2. Discuss the causation, symptoms, differential diagnosis and treatment of catarrhal jaundice.

3. Describe the causation, symptoms, differential diagnosis and treatment of epidemic cerebro-spinal meningitis.

4. (*a*) Give the causation, diagnosis, course and treatment of tinea tonsurans (ringworm of the scalp). (*b*) Give the diagnostic features and detail treatment of scabies.

5. What are the most common types of growth in brain or brain membranes causing symptoms of cerebral tumor? Discuss the general symptoms of such growths, and give localizing features of a growth in any selected area of cerebrum.

6. A business man, 48 years old, of sedentary habits, with good appetite and using alcohol and tobacco moderately, consults you for frequent headaches and tendency to be forgetful. On examination you find a high tension pulse, systolic blood pressure of 190 mm., while urine shows a trace of albumin and a few hyaline

casts. Describe further examinations you would think necessary, and discuss diagnosis, prognosis, and treatment.

SURGERY.

1. (*a*) Describe the symptoms of fracture of the spine at lower dorsal region. (*b*) Give treatment. (*c*) Give indication for operation. (*d*) Describe the operation.

2. (*a*) In what diseases of the kidneys do you consider its removal advisable? (*b*) Give differential diagnosis between any two of these diseases. (*c*) Describe the operation for removal.

3. (*a*) Give symptoms of ulcer of the stomach. (*b*) From what other diseases must it be differentiated? (*c*) Under what conditions is operation necessary? (*d*) Describe the operation.

4. (*a*) Describe the symptoms of a strangulated hernia (inguinal). (*b*) Give methods of treatment. (*c*) Describe the operation when the intestine is gangrenous.

5. (*a*) Describe the symptoms of a fracture of the middle of the femur. (*b*) Give treatment in detail in an adult.

OBSTETRICS AND GYNECOLOGY.

1. Cystitis: give causes, course and treatment.

2. Describe the operation for (*a*) a recent laceration of the perineum, (*b*) an old laceration, and (*c*) mention the most important features of each case.

3. What conditions are often mistaken for pregnancy? How would you establish a diagnosis?

4. Define accidental hæmorrhage and give its prognosis and treatment.

5. Give (*a*) the characters and duration of normal lochia, (*b*) causes of suppression, (*c*) causes of prolonged continuance.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

COLLEGE OF PHYSICIANS AND SURGEONS OF ONTARIO.

MEDICINE.

1. ENDOCARDITIS.

Types:—I. Acute { Simple / Malignant or Ulcerative { Septic / Typhoid / Cardiac

II. Chronic.

The difference between simple and malignant endo-

carditis is probably one of degree rather than of kind.

Etiology: Simple endocarditis is associated with rheumatism or scarlet fever. Malignant endocarditis is also associated with rheumatism, scarlet fever, and also with pneumonia or septic processes. Micrococci are often found. Chronic endocarditis may follow an acute endocarditis, or may be the result of syphilis, old age, high arterial tension, gout.

Morbid Anatomy: In the simple form there will be found a cloudiness, followed by edematous thickening of the valvular endocardium; superficial erosions, and the formation of small granulations; deposits of layers of fibrin and corpuscles from the blood, the whole process resulting in the formation of small warty vegetations. These vegetations are most marked at a slight distance from the free borders of the valves—*i.e.* those parts which come into opposition during closure. In course of time they are transformed into fibrous tissue. According to Poynton and Paine the infective organisms are conveyed to the base of the valves by the capillaries, and thence pass to the subendothelial tissues by the minute nutrient channels in the valvular substance; others hold that the organisms are derived from the blood circulating over the surface of the valves. In the malignant form the initial changes are similar, but there are some important differences, inasmuch as ulcerations may completely replace the vegetations. The differences are: (1) The vegetations when present are larger and fungating. (2) The underlying tissues are necrotic and show loss of substance and round-celled infiltration. (3) They contain masses of micrococci, while in simple endocarditis the organisms are scanty. The two forms cannot be distinguished by the organisms producing them; either simple or malignant endocarditis may arise from a pyogenic infection. (4) When the vegetations become detached they form *septic* emboli, giving rise to metastatic abscesses. (5) The ulcerative process causes great destruction of the valves, and may even lead to perforation of the curtains. (6) The subsequent or permanent changes in the valves, if the patient survive, are much more marked. (7) If the vegetation touches the mural endocardium as it flaps to and fro, the part touched becomes affected by contact.

As regards the side of the heart most affected—*Congenital* endocarditis attacks the right side of the heart (but note that many congenital cardiac lesions are due not to endocarditis, but to developmental faults); simple endocarditis attacks the left only; the *malignant* at-

tacks *both sides*, though the *left* is much more implicated than the right side.

The vegetations are upon that side of the valve opposed to the blood-stream—viz., at the aortic valve the vegetations project into the ventricle, at the mitral valve into the auricle.

As in pericarditis, the myocardium almost always shares in the inflammatory affection.

In *chronic* endocarditis, when not directly due to acute endocarditis, the changes are: Formation of small nodular prominences, with thickening of the valve. The vegetations are much firmer than in the acute disease. Formation of yellowish, opaque fatty patches. Great increase of fibrous tissue, which subsequently contracts, producing much deformity. The cusps become rigid, curled, and may cause great destruction to the onward flow of blood, and at the same time fail accurately to close together when required. Great narrowing of the valvular orifice. Shortening of the chordæ tendineæ and papillary muscles. Frequently fusion of the chordæ tendineæ (adhesions). Calcification of the fibrosed portion.—(Wheeler and Jack.)

Clinical Manifestations: "Simple Endocarditis.—The signs are extremely ill marked; possibly increased rapidity of pulse, dyspnea, precordial distress, etc., may attract attention to the heart. On examination some dilatation of the heart, from the accompanying myocarditis, may be found, and a *recently developed murmur* of a soft blowing or bellows-like character may be heard in the mitral or aortic areas. The commonest murmurs are those of mitral regurgitation (systolic), or mitral stenosis (presystolic).

"It should be remembered, however, that in most fevers the heart is somewhat dilated, and a murmur, *not due to endocarditis*, may be present. We must therefore be cautious in coming to a too rapid conclusion that a suddenly developed murmur is indicative of endocarditis. An important distinction is that the onset of endocarditis is usually accompanied by a smart rise in temperature above the previous level, while in hemic murmurs, or those due to simple dilatation, this is absent. A diastolic murmur in the aortic area is likely to be organic (aortic regurgitation).

"Malignant Form.—Three types may be distinguished —*The Septic Type* is characterized by the symptoms of septic infection—viz., rigors, sweats, oscillating temperature, emaciation and metastic abscesses. The symptoms may continue for months. *The Typhoid Type* is characterized by irregular or intermittent temperature,

looseness of the bowels, petechial rashes, and a rapid assumption of the typhoid state. Great difficulty may be experienced in distinguishing this form from typhoid fever or meningitis. *The Cardiac Type* is that in which symptoms of acute endocarditis, with fever of a septic type, appear in the course of a chronic valvular lesion. In some of these cases death is rapid; others may recover after a protracted illness.

"Along with these general symptoms there are usually definite cardiac signs—development of murmur, dilatation of the heart, cardiac irregularity, and so on. But the cardiac symptoms may be altogether latent, causing difficulty in diagnosis."—(Wheeler and Jack's *Handbook of Medicine.*)

2. CIRRHOSIS OF LIVER. *Varieties:* Portal, or atrophic or alcoholic; biliary or hypertrophic; also syphilitic or pericellular.

Pathology. In *atrophic cirrhosis* the liver may be very small, but is sometimes enormously enlarged. The latter condition may be caused by congestion or fatty changes. Generally, in the atrophic condition, the surface of the liver is rough and nodular. The connective tissue is increased in quantity, and the liver cells are destroyed (probably by the poison which causes the disease). The fibrous tissue in Glisson's capsule is increased, the portal circulation is obstructed, and later the bile ducts are obstructed and the hepatic cells become obliterated. In the *hypertrophic cirrhosis* the liver is always enlarged. The following table (from Wheeler and Jack) gives the important features of the morbid anatomy of the two varieties of cirrhosis, together with the differences:

PORTAL OR MULTILOBULAR CIRRHOSIS	BILIARY OR UNILOBULAR CIRRHOSIS
1. The bile-ducts are not involved, and jaundice is a late sysmptom.	1. The smaller bile-ducts are inflamed (cholangitis); jaundice is early and severe.
2. The new-formed connective tissue compresses the branches of the portal vein.	2. The portal circulation is not impeded.
3. In the earlier stages, active congestion and proliferation of connective tissue in the portal spaces may cause increase in the size of the liver; later, there is usually contraction.	3. The new tissue is diffused throughout the organ, and causes a great increase in size.
4. The capsule is much thickened, and the surface is rough and hob-nailed.	4. The capsule is not thickened, and the surface is smooth (like morocco leather).

PORTAL OR MULTILOBULAR CIRRHOSIS	BILIARY OR UNILOBULAR CIRRHOSIS
5. The masses of liver cells vary in size, some consisting of several lobules, others being smaller than a lobule. Each mass forms a *distinct area* with a rounded outline, and is enclosed in a fibrous girdle	5. The masses of liver cells consist of isolated lobules. The cut surface has a uniform and finely-granulated appearance.
6. On microscopic examination, the process is seen to be going on *chiefly* at the periphery of the lobules. The fibrous tissue is very dense.	6. The fibrous tissue is not confined to the periphery, but invades the substance of the lobules. It is much more open than that of portal cirrhosis.

Symptoms. Atrophic cirrhosis presents gastric catarrh, with anorexia, dyspepsia, nausea, flatulence, diarrhea and sometimes hematemesis. The liver is tender and enlarged at the beginning of the disease. As the disease progresses, and the pressure in the portal system increases, the liver and spleen enlarge, the superficial abdominal veins become prominent, ascites and swelling of the feet are observed, hemorrhoids develop and there may be hemorrhage from the stomach or bowel. Later, the liver gets smaller, the patient loses flesh and strength, slight jaundice may be present, fever, headache, and nervous symptoms (stupor, delirium, convulsions and coma) may appear. In the *hypertrophic cirrhosis* the liver is much enlarged, the spleen enlarged, jaundice is marked, there is pronounced loss of flesh and strength, hemorrhages into the skin and from the mucous membrane may occur, pain in the hepatic region, fever and vomiting are of common occurrence. Ascites and dilated abdominal veins are absent.

Treatment. In *atrophic cirrhosis*, alcohol must be forbidden; for the gastric catarrh, bismuth and alkalies may be adopted; the portal congestion is relieved by salines and diuretics; Epsom salts, compound jalap powder, claterium, squill, digitalis and calomel have been recommended. Paracentesis is indicated for the ascites; epiplopexy has also been suggested. In the *hypertrophic* variety the treatment is symptomatic only, and follows the lines laid down under *atrophic cirrhosis*. The atrophic variety is amenable to treatment in the early stages.

3. DIABETES MELLITUS. The *mode of onset* is gradual, and generally it is the frequency of urination or the extreme thirst which attracts the patient's atten-

tion. Occasionally the disease sets in somewhat rapidly, following injury or a severe chill or intense and sudden emotion.

The *urinary findings* are: Increased quantity voided, from 3 or 4 quarts to 20 quarts or more in a day; the specific gravity is generally high, 1020 to 1045; the urine is pale in color and has a sweetish odor and taste; the reaction is acid; glucose is present in varying amounts, from 10 to 20 or more ounces being excreted in a day; the urea is increased, and so is the nitrogenous output in general; acetone, diacetic acid, beta-oxybutyric acid are often present; phosphates and sodium chloride are often present in increased quantities; fat and gas in the urine are sometimes met with; albumin may be present.

Treatment. The diet must be carefully regulated, and explicit written directions must be given to the patient. The carbohydrates must be limited, the diet consisting of proteins and fat, the tolerance for carbohydrates must be built up and increased, and a sufficient number of calories must be supplied. With many patients the gradual withdrawal of carbohydrates is tolerated better than their sudden restriction. The percentage of sugar in the urine when the patient is on a general diet is first to be calculated, then the amount on a sugar-free diet, and then the quantity of carbohydrate which can be given without glycosuria appearing. Recently the *starvation diet* of Allen and Joslin has been recommended, but the details of this method are too lengthy for insertion here. Care must be taken lest a diet which is too exclusively nitrogenous should throw an excessive strain upon the liver and kidneys. As a general rule, diabetics *must not take*: Liver, sugars, sweets or starches of any kind, wheaten bread or biscuits, corn bread, oatmeal, barley, rice, rye bread, arrowroot, sago, macaroni, tapioca, vermicelli, potatoes, parsnips, beets, turnips, peas, carrots, melons, fruits, puddings, pastry, pies, ices, honey, jams, sweet or sparkling wines, cordials, cider, porter, lager, chestnuts, peanuts. They may, as a rule, be allowed a diet selected from the following: Soups or broths of beef, chicken, mutton, veal, oysters, clams, terrapin or turtle (not thickened with any farinaceous substances), beef tea, shell fish and all kinds of fish, fresh, salted, dried, pickled or otherwise preserved (no dressing containing flour), eggs, fat beef, mutton, ham or bacon, poultry, sweetbreads, calf's head, sausage, kidneys, pig's feet, tongue, tripe, game (all cooked free of flour, potatoes, bread or crackers), gluten porridge, gluten bread, gluten gems,

gluten biscuits, gluten wafers, gluten griddle cakes, almond bread or cakes, bran bread or cakes. String beans, spinach, beet-tops, chicory, kale, lettuce plain or dressed with oil and vinegar, cucumbers, onions, tomatoes, mushrooms, asparagus, oyster plant, celery, dandelions, cresses, radishes, pickles, olives, custards, jellies, creams (without sugar), walnuts, almonds, filberts, Brazil nuts, cocoanuts, pecans, tea or coffee (without sugar), pure water, peptonized milk.

In every case the diet list must be prepared for the individual patient. The general health must also be attended to. The patient should lead a quiet life, free from worry, take gentle exercise, bathe daily in warm water, and only take drugs when indicated. The most commonly used drugs are codeine, morphine, strychnine, arsenic and cod liver oil. For the extreme thirst citrate of potassium or lemon juice with water may be given.

4. TYPHOID FEVER. *Etiology.* The exciting cause is presence of the *bacillus typhosus.* It may be communicated by contaminated food, milk, water, dust, soiled hands, clothing, instruments or utensils, flies, "carriers," or anything that has become contaminated with the feces, urine or vomitus of one affected with the disease.

The *prodromal symptoms* are vague. There are pain in the head or back or limbs, general depression, anorexia, nausea, chills, headache, epigastric oppression, diarrhea or constipation, disturbed sleep, cough, nosebleed.

Course of the disease. After the prodromal symptoms the patient takes to his bed, and from this the definite onset is generally dated. "During the *first week* there is, in some cases (but by no means in all, as has long been taught), a steady rise in the fever, the evening record rising a degree or a degree and a half higher each day, reaching 103° or 104°. The pulse is rapid, from 100 to 110, full in volume, but of low tension and often dicrotic; the tongue is coated and white; the abdomen is slightly distended and tender. Unless the fever is high there is no delirium, but the patient complains of headache, and there may be mental confusion and wandering at night. The bowels may be constipated, or there may be two or three loose movements daily. Toward the end of the week the spleen becomes enlarged and the rash appears in the form of rose-colored spots, seen first on the skin of the abdomen. Cough and bronchitic symptoms are not uncommon at the outset. In the *second week,* in cases of moderate severity, the symptoms become aggravated;

the fever remains high and the morning remission is slight. The pulse is rapid and loses its dicrotic character. There is no longer headache, but there are mental torpor and dulness. The face looks heavy; the lips are dry; the tongue, in severe cases, becomes dry also. The abdominal symptoms, if present—diarrhea, tympanites, and tenderness—become aggravated. Death may occur during this week, with pronounced nervous symptoms, or, toward the end of it, from hemorrhage or perforation. In mild cases the temperature declines, and by the fourteenth day may be normal. In the *third week*, in cases of moderate severity, the pulse ranges from 110 to 130; the temperature now shows marked morning remissions, and there is a gradual decline in the fever. The loss of flesh is now more noticeable, and the weakness is pronounced. Diarrhea and meteorism may now occur for the first time. Unfavorable symptoms at this stage are the pulmonary complications, increasing feebleness of the heart, and pronounced delirium with muscular tremor. Special dangers are perforation and hemorrhage. With the *fourth week*, in a majority of instances, convalescence begins. The temperature gradually reaches the normal point, the diarrhea stops, the tongue cleans, and the desire for food returns. In severe cases the fourth and even the fifth week may present an aggravated picture of the third; the patient grows weaker, the pulse more rapid and feeble, the tongue dry, and the abdomen distended. He lies in a condition of profound stupor, with low muttering delirium and subsultus tendinum, and passes the feces and urine involuntarily. Heartfailure and secondary complications are the chief dangers of this period. In the *fifth and sixth weeks* protracted cases may still show irregular fever, and convalescence may not set in until after the fortieth day. In this period we meet with relapses in the milder forms or slight recrudescence of the fever. At this time, too, occur many of the complications and sequelæ."—(Osler's *Practice of Medicine.*)

Treatment. "This is largely supportive and prophylactic. On account of the wide distribution of the bacilli in the secretions, it is highly important that the excreta and all substances which come in contact with the patient should be thoroughly disinfected to prevent dissemination of the disease. Corrosive sublimate (1:500), carbolic acid (1:10), and chlorinated lime are used to disinfect the stools. Weaker solutions may be employed for sponging the perineum and anal region of the patient and for washing the hands of the attend-

ants. The general treatment consists in absolute rest in bed with the enforced use of the bed-pan. The diet should be liquid, largely milk, and should be administered every three hours. The modern tendency is toward a more liberal diet, and the high calory diet (as advocated by Coleman) adds to the comfort of the patient, shortens the convalescence and lowers the death-rate. Fever should be controlled by sponging, by the wet pack, and by the full bath. The Brand method consists in immersion of the body in a tub of water (70° F.) for 15 or 20 minutes every third hour when the temperature rises above 102.5° F. The medicinal treatment includes the use of antipyretics, intestinal antiseptics, and antityphoid serum. Abdominal pain, tympanites, and tenderness are best treated with fomentations and turpentine stupes, while meteorism may be relieved by the internal administration of turpentine and by the use of the rectal tube or injections of the milk of asafetida (ʒ 5-6). Diarrhea, when it exceeds 4 or 5 stools daily, will require the withholding of all food except milk and the administration of opium, bismuth, codeine, etc. Constipation should be relieved every 2 days by enemas containing soapsuds. When hemorrhage occurs, the foot of the bed should be elevated, an ice-bag or iced cloth should be applied to the abdomen, morphine should be given hypodermically, and opium (gr. 1) should be administered by the mouth every three hours. Peritonitis usually terminates fatally, and requires the same treatment as hemorrhage. Abdominal section should be performed as soon as the diagnosis is positive. Alcohol, ammonia, strychnine, digitalis, etc., should be used if heart-failure supervenes. Nervous symptoms are greatly lessened by hydrotherapy, but nerve-sedatives may be necessary. Sore mouth may be prevented by cleanliness and the use of carbolized glycerin solution (0.5 per cent.) upon the gums and teeth."—(*Pocket Cyclopedia.*)

5. *Impetigo contagiosa* is an acute, contagious, inflammatory disease of the skin, characterized by discrete, flat, superficial vesicles or blebs, which rapidly become pustular and dry upon the skin as thin crusts. The eruption is most common upon the face and hands. The lesions begin as flat vesicles or blebs, which, in the course of twenty-four hours, become vesiculopustular or pustular. Rupture soon occurs, the exudate drying upon the skin as thin, wafer-like crusts, which appear to be "stuck on." The edges of the crusts become detached, curl up, and the crusts drop off, exposing to view reddish spots which soon fade. The lesions at

times show a tendency to umbilication. A coalescence of neighboring pustules may occur, leading to the formation of patches of considerable size. In severe cases there may be slight febrile disturbance. Itching is slight or absent. Occasionally the eruption takes on a circinate form. The affection is chiefly seen in poor children. It is likely to accompany pediculosis capitis, as the result of scratching. Epidemics of contagious impetigo are not uncommon in institutions for children. The affection is caused by inoculation with the ordinary pus microorganisms, particularly the staphylococcus pyogenes aureus. The chief characteristics are the discreteness, superficiality, and autoinoculability of the lesions. The affection may be cured in a week or ten days, or, indeed, may get well spontaneously. The crusts may be removed with soap and warm water, after which an ointment of ammoniated mercury (gr. xxx to 1 ounce of petrolatum) should be applied; mild antiseptics may be employed, care being taken to avoid irritation.—(*Cyclopedia of Medicine and Surgery.*)

Herpes zoster is probably an acute specific disease of the nervous system, characterized by the formation of grouped vesicles along the line of a cutaneous nerve, and accompanied by neuralgic pains. Cold, anemia, excessive use of arsenic, malaria have been mentioned as causative factors. There is an irritative or inflammatory condition of the central, spinal, or peripheral nerve apparatus. The process is usually an interstitial descending neuritis of one of the spinal ganglia. The parts affected should be protected from injury by a dusting powder or collodion; the pain may demand morphine. Internally, zinc phosphide, and tonics have been recommended.

Alopecia areata is a disease of the hairy system characterized by the more or less sudden occurrence of round or oval, circumscribed, bald patches, in rare cases coalescing and producing total baldness. The cause is usually neurotic in character, although at times the disease seems to be caused by a parasite. The characteristics of the disease are the circumscribed areas of baldness, the pale, smooth skin, the contracted follicles, and the rapid onset. Internally, arsenic, in addition to other tonics and stimulants, is of great service. Locally, stimulation of the scalp is indicated, for which purpose the essential oils, cantharides, capsicum, turpentine, and sulphur are recommended. The faradic current applied with a wire-brush electrode is often useful. In obstinate cases blistering may be resorted to.—(*Pocket Cyclopedia.*)

SURGERY.

1. (*a*) *Benign tumors* of the breast are generally found in young women, between the ages of 15 and 30. They grow very slowly and gradually. As a rule they are freely movable, are firm, round and oval, and the nearer they are to the skin the softer they are. They are not encapsulated, and don't cause retraction of the nipple or enlargement of the axillary glands. As a rule they are not painful. *Malignant tumors* are generally found in women between 30 and 60 years of age. Cachexia accompanies them. They grow rapidly. They are movable in the early stages, later they become adherent to the skin or pectoralis major muscle, and are hard and immovable. The nipple is retracted. The axillary glands are enlarged. Pain is a symptom. There may be metastatic growths.

(*b*) In *doubtful cases* it is well to imagine the growth to be malignant until it is proved otherwise. If the breast is removed, and the tumor is proved benign, the woman has lost a breast; whereas, if it is not removed, and should prove to be malignant, she will lose her life. The best plan is (with the consent of the patient) to prepare for a radical operation, excise a piece of the tumor, have it examined microscopically, and if it proves to be benign, remove the tumor; if it is malignant, remove the whole breast and neighboring lymphatic glands.

(*c*) *"Halsted's operation* aims to remove in one piece the entire breast and overlying skin, the costal portion of the pectoralis major, the pectoralis minor, and all the fat and glands of the axilla. The supraclavicular glands are removed in a second piece. An incision is carried through the skin and fat, and a triangular flap turned back. The costal portion of the pectoralis major is divided close to the ribs and separated from the clavicular portion, which with the overlying skin is divided up to the clavicle, exposing the apex of the axilla; these flaps are drawn upward with a retractor and separated from the underlying tissues, and the muscle further split as far as the humerus, where it is severed close to the bone. The breast, pectoralis major, and all fat are stripped from the chest wall, including the pectoralis minor, which is divided at each end, thus exposing the entire axilla, which is cleansed of fat and lymphatic glands from above and within, downward and outward, all small vessels being ligated close to the axillary vessels, which, with the nerves, should alone remain. The triangular flap of skin is drawn outward and the lateral and posterior walls of the axilla like-

wise cleared, the subscapular vessels being ligated, and the subscapular nerves preserved if possible. The mass is then turned inward and removed from the chest. A vertical incision is now made along the posterior margin of the sternomastoid, and the supra- and infraclavicular fat and glands removed by dissecting from the junction of the internal jugular and subclavian veins downward and outward. The cervical wound is sutured, and the edges of the chest wound approximated by a buried purse-string suture of silk, which includes the base of the triangular flap, the apex being spread over the axilla. The rest of the wound is covered with Thiersch's skin grafts. The axilla is not drained. The disability resulting after such an extensive operation is surprisingly slight. The entire wound may be closed in most cases by fashioning two flaps from the lower lip of the wound. A small gauze drain should always be placed in the axilla, preferably through a small incision at its posterior margin, in order to drain the large quantity of fluid which escapes from the severed lymph vessels."—(Stewart's *Surgery*.)

2. *Intussusception* is the telescoping of one part of the intestine into the part immediately below. It is said to be due to irregular peristalsis; trauma, diarrhea, intestinal worms, polypi and new growths in the intestinal wall have all been credited with causing the condition.

(*b*) *Acute intussusception* is most common in children. It begins suddenly with severe abdominal pain and vomiting. Blood-stained mucus is passed, perhaps with tenesmus. Collapse soon comes on, and may be fatal in twenty-four hours; otherwise death occurs in a few days from peritonitis. In most cases a "sausage-shaped" tumor can be felt, usually along the course of the colon, but lower down, or just above the pubis The right iliac fossa feels empty. A natural cure may follow, but rarely, from sloughing of the intussusceptum, whilst the peritoneal cavity is protected by adhesions uniting the entering and ensheathing layers.

(*c*) *Treatment.* "The reduction of the intussusception at the earliest possible moment is the only treatment admissible, and this can only be done with certainty by operation. The abdomen should be opened over the tumor if it can be felt; if not, in the mid-line below the umbilicus. The intussusception is then reduced by squeezing out the entering portion, beginning at the lowest part. The intestine should never be pulled out, for fear of tearing it. If there is any difficulty, the wound must be enlarged and the lump brought out. If,

owing to adhesions, reduction cannot be done, the intussuscepted portion must be excised through an incision in the ensheathing layer, but the outlook is bad in these cases. If the bowel is gangrenous, the condition is so bad that nothing more can be done than to bring out the coil and establish an artificial anus. If, owing to any reason, an operation is not possible, nonoperative procedures must be tried. These consist of attempting to reduce the invagination by inflation with air or, better still, by fluid. A catheter is passed into the rectum and fluid poured in from a funnel raised not more than 2 feet. A hand is placed over the tumor to feel when the lump disappears. The objections to this are that after twelve hours reduction cannot be obtained by this method; that valuable time is wasted if it fails; that you cannot tell if the last inch has been reduced (and if it has not, recurrence is certain); that it is no use in the enteric or ileocolic forms, and that the bowel may be ruptured."—(*Aids to Surgery.*)

5. (*a*) *Amputation in the middle of the forearm.* "An anterior and a posterior U-shaped flap are incised on the respective aspects of the forearm, the base of each flap at the saw-line being equal to a half-circumference of the limb at that line and the length of each equal to three-fourths of the diameter—the hand being supinated in making the anterior flap and the forearm vertical in making the posterior flap. Having cut through skin and fascia in outlining the flaps, these incisions are now deepened upon the line of the retracted skin, beginning at the ulnar side of the anterior flap, in case of the right arm (and on the radial side upon the opposite arm). The vertical ulnar incision will involve the flexor carpi ulnaris and flexor profundus—the vertical radial incision will involve the two radial carpal extensors—both vertical incisions passing directly to the bones. The muscles on the anterior and posterior aspects of the forearm, at the lower rounded extremities of the flaps, are cut from without inward in such a manner as to bevel them slightly. The entire flaps are now raised from the bones up to a point sufficiently below the saw-line to furnish a musculoperiosteal covering—at which level the periosteum is circularly divided around the bones, the interosseous membrane cut transversely, and the musculoperiosteal covering freed to the saw-line. The soft parts are then retracted and the bones sawed. The radial, ulnar, anterior and posterior interosseous arteries are tied. The median, radial, and ulnar nerves should be cut short,

or even dissected from the flap. The musculoperiosteal covering is sutured and the muscles quilted—and the integuments sutured in a lateral line."—(Bickham's *Operative Surgery.*)

(*b*) In amputation of forearm at middle third there will be severed: Skin; fascia; muscles:—supinator longus, extensor carpi radialis longior and brevior, extensor communis digitorum, extensor carpi ulnaris, supinator brevis, anconeus, pronator radii teres, flexor carpi radialis, palmaris longus, flexor sublimis digitorum, flexor carpi ulnaris, flexor profundus digitorum; arteries:—anterior interosseous, posterior interosseous, radial, ulnar; veins:—radial, interosseous, ulnar, median; nerves:—posterior interosseous, radial, median, ulnar; bones:—radius, ulna.

4. *Anal fissure* is characterized by the very severe pain on defecation, and for some time afterward; constipation and pruritus are commonly present; local examination shows a "sentinal pile," on the inner side of which is a very painful ulcer or fissure.

Hemorrhoids. The patient complains of a feeling of weight, itching, tenesmus. There is but little pain unless a fissure or ulcer is also present. Internal hemorrhoids, if protruding, are painful; bleeding may be severe. The hemorrhoids are readily seen if external; internal hemorrhoids may be seen if the patient strains, or they protrude during defecation.

Carcinoma of the rectum generally attacks persons past middle age. At first there may be no symptoms beyond itching and occasional bleeding; then diarrhea, straining at stool, the discharge of pus or mucus may be observed; pain may be present, which radiates to the back and thighs. Under anesthesia the carcinoma may be seen by the proctoscope or felt by the examiner's finger. In the later stages cachexia develops and the symptoms of stricture are present.

Treatment of anal fissure. The base of the fissure (including the external sphincter) must be divided; all piles (including the "sentinal pile") must be removed; the ulcer must be excised. The wound then heals by granulation. The bowels must be kept relaxed.

The *treatment* of *external piles* when uninflamed consists in preventing constipation, keeping the parts clean, and applying hamamelis ointment. They seldom need removal except when associated with internal piles. Inflamed piles should be treated by rest, a large warm enema, and fomentations. If there is much pain the pile should be incised and the blood-clot turned out.

The *treatment* of *internal piles.* Constipation must

be avoided, also excesses in eating and drinking. The parts must be carefully cleansed and hamamelis ointment applied. Operations include clamp and cautery, ligature, and Whitehead's operation.

Operation for hemorrhoids. Clamp and cautery. *Radical treatment* is advisable when there is much pain and bleeding. It must be ascertained first that the piles are not due to disease elsewhere, as cirrhosis or stricture, or to pregnancy. The bowels are emptied and the patient is placed in the lithotomy position. The sphincter is then dilated with two thumbs to expose the piles, which are caught up with ring forceps. A clamp is applied to the piles in turn, and they are removed by the cautery. The bowels are kept confined for five or six days, when castor oil is given. Very little pain and no bleeding follow this operation. Removal can be done by snipping the mucous membrane around the pile and ligaturing its base. Crushing is also done.—(*Aids to Surgery.*)

The *treatment of cancer of the rectum* is excision of the rectum or colostomy. *Kraske's operation* (excision of the rectum by the sacral route): "With the patient lying on the right side, a median incision is made from the anus to the middle of the sacrum. The coccyx is excised. The ligaments and muscles are detached from the sides of the sacrum as high as a point just below the third sacral foramina, at which point the sacrum is sawn across and the lower piece removed. The rectum is exposed and cut through above and below the growth. The peritoneum may have to be opened to get above the tumor. If the sphincter and anus are unaffected they are left and the bowel is brought down and an end-to-end anastomosis is made. If the whole rectum has to be removed the upper end is either brought down and stitched to the skin around the original anus, or, if this is not possible, an anus is made just below the divided sacrum. During the operation the sacral glands must be searched for and removed if enlarged. Incontinence usually remains, and is less easy to manage with a truss than a colotomy."—(*Aids to Surgery.*)

5. "If the disease is at the *cardiac end* of the stomach, involving the cardiac orifice, the symptoms may resemble those of stricture of the esophagus and be associated with dysphagia, ending in an inability to swallow at first solid and later even fluid nourishment; in such cases the tumor, being well under cover of the ribs, is difficult or impossible to palpate, but enlargement of the supraclavicular glands on the left side is usually present.

"If the *pylorus* be the part involved, dilatation of the stomach with retention and decomposition of food and vomiting are pronounced symptoms, the vomiting being at first irregular, perhaps every second or third day, soon becoming daily and later occurring after every meal. Peristalsis may be accompanied by severe pain of a crampy character which is relieved by vomiting." —(Keen's *Surgery.*) There may be felt a tumor a little above and to the right of the umbilicus, at first movable but later fixed by adhesions. The pylorus becomes stenosed. In the later stages there are pressure symptoms, such as ascites, jaundice, edema of the legs, and varicose veins in the abdominal walls.

Treatment. When the *cardiac* end is involved only palliative operations are recommended; gastrostomy may be tried. When the disease is at the *pyloric* end, "complete removal of the affected segment of stomach and of the associated lymphatics is the only means of curing the disease. In many cases it is only after the parts have been exposed by laparotomy that it is possible to say whether or not the radical operation should be undertaken. If the associated glands are capable of being removed, and if there is no evidence of metastasis having occurred, the radical operation should be carried out. The term *pylorectomy* is applied when the operation is performed for malignant disease of the pylorus, although a considerable portion of the stomach must also be removed. Adhesion to and infiltration of the transverse colon is not usually a contraindication to the radical operation, as it is quite feasible to resect the portion of colon involved. The technique of the operation has been simplified by the preliminary ligation of the arteries distributed to the stomach and by the use of clamps. In the majorty of cases it is best to perform gastroenterostomy in the first place, choosing a healthy portion of the stomach; the resection is then carried out and the cut ends of the stomach and duodenum closed and invaginated. In weakly patients an interval may be allowed to elapse between the gastroenterostomy and the resection. The radical operation is contraindicated when the disease is associated with ascites, when the tumor has infiltrated the omentum, liver, pancreas, or abdominal wall, or when metastasis has occurred."—(Thomson and Miles' *Manual of Surgery.*)

OBSTETRICS AND GYNECOLOGY.

1. The patient should be instructed fully in the hygiene of pregnancy, by which is meant the care which should be observed by the pregnant woman for

the preservation of health and strength both of herself and of the fetus. The pregnant woman should take moderate exercise in the open air; in the last month massage may take the place of exercise. Daily bathing in tepid water, care of the teeth, regularity of the bowels, ample sleep in a well-ventilated room, plenty (but not too much) of simple, nourishing and easily digested food at regular hours, clothing not too tight, especially about the abdomen and breast; attention to the nipples, regular examination of the urine, and the restriction of marital relations are the main points to which advice should be directed. In addition certain measurements are necessary; a pelvimeter will be required to make these measurements. The interspinal and intercristal diameters are measured, also the distance between the ischial tuberosities and the anteroposterior diameter, as well as the external conjugate. It is well to notice if the subpubic arch is narrowed; the diagonal conjugate is also estimated; from the latter the true conjugate can be obtained.

Care of mother during puerperium. "*During the first week* the patient keeps the bed, but after the first few hours she has considerable license. She may assume the sitting or halfsitting posture to take her meals and to nurse the baby, and, if necessary, for evacuation of the bladder and rectum. She should assume the lateroprone posture both right and left several times a day, and lie upon her abdomen for at least an hour daily. Frequent change of position favors uterine drainage and massages the uterine supports. *During the second week* she has greater liberty, while the greater part of her time is spent on the bed or lounge. She may sit up for her meals, to urinate, and for bowel movements, and she should spend at least half an hour, twice daily, in abdominal and leg exercises to keep up her muscular tone. *The third week* she may be moved to a chair for a part of the day, having the liberty of the room. After sitting up for any length of time she should be instructed to take the genupectoral position before lying down. Prescribed exercises for the legs and abdominal muscles are to be taken daily. *The fourth week*, if all goes well, she may leave the room and have the benefits of air and sun. Physical exercises should be continued. The duration of the lying-in period and the degree of freedom to be given the patient after the second week must, however, depend on the character and amount of the lochia, the general progress of her convalescence, and the rate of the uterine involution."—(Polak's *Obstetrics.*)

2. *True labor pains* are the pains occurring at the commencement of labor, and which are coincident with expulsive efforts of the uterus. They begin at the back, pass to the front, occur at gradually shortening intervals, are accompanied by uterine contraction and increased opening of the os externum.

False labor pains occur before labor. They are feeble, do not last long, occur at long intervals, are not accompanied by contraction of the abdominal muscles, are generally felt in front, and do not cause opening of the os.

Weak pains are such as do not aid much in the expulsion of the fetus.

Cutting pains are the early pains experienced by the woman, and are so called from the "cutting" sensations experienced by the woman.

Atonic pains are the ineffective pains accompanying a condition of uterine inertia; the uterus does not harden to any extent, and contracts feebly and irregularly.

Expulsive pains are such as produce or accompany the expulsion of the fetus.

After pains are painful contractions of the uterus which occur after delivery (generally for two or three days).

3. *Indications for the use of forceps are:* "1. *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. 2. *Passages at fault:* Moderate narrowing 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. 3. *Passenger at fault:* A Dystocia due to (*a*) occipitoposterior, (*b*) mentoanterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). 3. *Accidental complications:* Hemorrhage; prolapsus funis; eclampsia. All acute or chronic diseases of complications in which immediate delivery is required in the interest of mother or child or both."—(From Jewett's *Practice of Obstetrics.*) *Contraindications:* Mechanical obstruction in the parturient canal; incomplete dilatation of the os; non-rupture of membranes; non-engagement of the presenting part; the fetal head being too large or too small; distended bladder or rectum.

Pituitrin may be used in cases of uterine inertia, provided the os is dilated and there is no obstruction to delivery.

4. The condition may be anyone of the following:

Pregnancy, uterine fibroid, ascites, ovarian cyst, fat, pseudocyesis, and subinvolution of the uterus.

Pregnancy: The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor and the general condition of the patient's health may also help in arriving at a diagnosis.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

Ascites: Absence of the signs of pregnancy; the abdomen is distended, but the shape varies with the position of the patient; on lying down there is bulging at the sides, the tumor fluctuates, and percussion shows dullness in the flanks, with resonance in the median line, but the dullness varies with the position of the patient.

Ovarian cyst: Absence of the chief signs of pregnancy; there may be the characteristic facies, the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

Fat: Absence of signs of pregnancy, also of fibroid, or ascites.

Pseudocyesis: The uterus is not enlarged, and the administration of a general anesthetic causes the collapse of the "tumor."

Subinvolution of uterus: The uterus does not increase in size, there is a leucorrhea, there is generally pain in the back or ovarian region, there is a history of irregular (and profuse) menstruation, and the signs of pregnancy are absent.

5. PROLAPSUS UTERI. *Etiology:* Injury at childbirth, lacerated perineum, relaxation and elongation of the ligaments of the uterus, loss of rigidity of the abdominal walls, increase in the weight of the uterus, subinvolution, increased intraabdominal pressure. *Symptoms:* The patient complains of a feeling of "bearing down"; of trouble with micturition and defecation; of pain and fatigue on walking, and of "falling of the womb." The cervix is low down in the vagina; the sound shows that the uterine cavity is lengthened. Procidentia is evident on inspection. *Treatment:* "A prolapsed uterus must first be placed in proper position, or a procidentia reduced. In many cases the introduction of a rubber

ring pessary will then suffice to prevent recurrence. But it will often be found necessary to repair a torn perineum, removing at the same time redundant portions of the vaginal walls, before the ring will remain in the vagina. When such an operation is contraindicated, and the vaginal orifice is so wide that a ring cannot be kept in, some form of pessary with a vaginal stem and perineal bands will be required. In cases of procidentia, where the exposed surface is much ulcerated, the patient should be kept in bed, emollient applications made to the ulcers, and vaginal douches given. When the ulcers have healed, a pessary may be introduced. Procidentia due to supravaginal elongation of the cervix must be differently dealt with. Amputation of a portion of the cervix must therefore form the first step in the treatment, and it may be required also when the hyperplasia is secondary to descent. Cases of prolapse and procidentia which resist milder measures require further operative procedures, such as ventrofixation of the uterus or the shortening of the round ligaments. It is in cases of this kind that hysteropexy has often given satisfactory results. Total extirpation of the uterus has been practised for the treatment of procidentia."—(Sutton and Giles' *Diseases of Women.*)

MEDICINE.

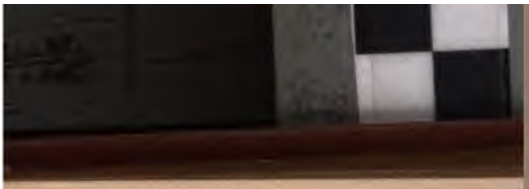
1. *Acute lobar pneumonia* "begins with a severe and usually protracted chill, followed by a rapid rise of temperature, 103° to 104° F., a strong, full, but rapid pulse, soon showing evidence of embarrassed cardiac action. There are also present pain near the nipple, aggravated by pressure, breathing, or coughing; shortness of breath, the number of respirations increasing to 40, 50, or more a minute; disturbance of the ratio between pulse and respiration; and cough, at first short, ringing, and harsh, followed by a scanty, frothy, mucoid expectoration. The sputum soon becomes transparent, viscid, and tenacious, changing about the second day to the familiar rusty sputum. The quantity is increased and a yellow color is assumed as the disease advances. The prostration is pronounced. The face is flushed, especially over the malar bones. The lips are more or less blue and herpes may be observed. Epistaxis, headache, sleeplessness, and gastric disturbances are common. The tongue is coated, the appetite is impaired, and there is constipation. Delirium is sometimes present. The urine is small in amount, highly colored, deficient in chlorides, and often slightly albuminous. The blood shows evidences of leucocytosis. The fever usually reaches its

maximum within twenty-four hours and continues high, with diurnal remissions, until the fifth, seventh, ninth, or eleventh day, when a crisis occurs, and within twenty-four hours all the symptoms are lessened, the fever absent, and convalescence is established. Occasionally, the termination is by lysis.

"*Physical signs over the affected lung:* Palpation during the first stage shows the vocal fremitus to be more distinct than normal. In the second stage, the vocal fremitus is markedly exaggerated, except in case of occlusion of the bronchi by secretion. In the first stage, the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage there is dullness over the affected parts, with an increased sense of resistance. In the first stage there is a feeble vesicular murmur, associated with the true vesicular (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except when the bronchi are filled with secretion. Bronchophony is present and at times pectoriloquy may be heard. In the third stage, the breathing changes from bronchial to bronchovesicular and the crepitant râle returns. As resolution proceeds, the breath sounds are associated with large and small moist and bubbling râles."—(Hughes' *Practice of Medicine.*)

2. CATARRHAL JAUNDICE. "*Causes.*—Extension of gastrointestinal inflammation is the most common cause. Atmospheric changes, passive congestion of the liver, and the infectious fevers are less frequent factors.

"*Symptoms.*—The affection begins with epigastric distress, coated tongue, impaired appetite, nausea, with perhaps vomiting, looseness of the bowels, and slight feverishness. In from three to five days the eyes become yellow, and jaundice gradually appears over the whole body; the feverishness disappears, the skin becomes harsh, dry, and itchy, the bowels constipated, the stools whitish or clay-colored, accompanied with much flatus and colicky pains; the urine heavy and dark, loaded with urates and containing biliary elements. When the jaundice is complete, the surface is cold, the heart's action slow, the mind torpid and greatly depressed, and there is pain or tenderness on pressure over the hepatic region. The symptoms subside within a few days after the jaundice appears, but the depression, discoloration, and condition of the bowels persist for one or two weeks."



"*Differential Diagnosis.*—When jaundice is induced by obstruction to the outflow of bile other than that produced by inflammation, such as arises from stricture of the common duct, tumors of the abdominal viscera, foreign bodies such as gall-stones and parasites, fecal accumulations, spasms of the bile ducts due to emotion, etc., the symptoms of these different affections will be found associated with the icteroid manifestations. *Non-obstructive or hematogenous jaundice* is unassociated with inflammatory changes in the bile ducts, and arises from disintegration of the blood or hemolysis. It differs from catarrhal jaundice in its history, the absence of clay-colored stools, and less staining of the urine.

"*Treatment.*—The patient should be placed at rest in bed and the diet restricted to milk and lime-water, broths, eggs, lean meats, etc., care being taken to eliminate all starchy, fatty, or saccharine substances. Calomel, gr. ¼, with sodium bicarbonate, gr. iij, should be then given every two hours until twelve doses are taken, followed by Hunyadi water. Sodium phosphate, ʒj, may also be given, well diluted, every four hours. The dry, itching skin may be relieved by diaphoresis, a hot bath containing potassium carbonate night and morning, or a weak carbolic acid solution. If insomnia is present potassium bromide, gr. xxx, may be administered. Diuretics are indicated if the urine continues scanty, preference being given to the alkaline waters, potassium bitartrate lemonade, and spirit of nitrous ether, ℥x to xx. In cases in which the constipation persists, aloes, podophyllum, colocynth, and other cholagogues should be employed. Irrigation of the colon once daily with cold water, gradually increasing the temperature, is often very effective."—(Hughes' *Practice of Medicine.*)

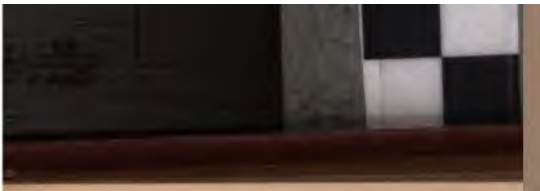
3. Cerebrospinal Meningitis. *Causation.*—The disease is caused by the *Diplococcus intracellularis meningitidis;* other microorganisms are also supposed to be capable of causing the disease. Predisposing causes are bad hygiene, overcrowding, foul air, poor food. The diplococcus is believed to gain entrance to the body through the nasal mucous membrane, and the infection leaves the body through the same channel. "Carriers" may transmit the disease through their nasal discharge. *Symptoms:* Sudden onset, with headache, vomiting, rigors, stiffness of neck and back producing opisthotonos, pulse full and rapid, temperature about 102° F., photophobia, delirium; Kernig's sign is present, and the diplococci may be found in the cerebrospinal fluid after lumbar puncture; the tâche cérébrale may be observed,

and leucocytosis is present. The *diagnosis* is made from the symptoms, chiefly the presence of Kernig's sign and the diplococci in the cerebrospinal fluid. In *typhoid fever* the onset is gradual, the temperature is characteristic, the opisthotonos and Kernig's sign are absent, there are no diplococci in the cerebrospinal fluid, and Widal's reaction may be present. *Tuberculous meningitis* is not epidemic, is not of sudden onset, and a primary focus of tuberculosis may generally be detected elsewhere. *Treatment:* Isolation in an airy room, rest in bed, nourishing diet, ice bags to the nape of the neck, morphine for the pain, bromides for the restlessness, lumbar puncture to relieve the symptoms, and the injection of Flexner's serum. Stimulation may be necessary.

4. *Tinea tonsurans* (ringworm of the scalp) is a contagious affection due to the *trichophyton fungus* which invades the hair and hair follicles. It generally occurs in children, and is characterized by small circumscribed patches of baldness in which the hair is diseased and often broken off close to the scalp. Vesicles, pustules, and scales are observed. The patches spread and may be as large as a silver dollar. Itching is a constant symptom. The diagnosis is made certain by the presence of the fungus; a hair should be extracted, immersed in liquor potassæ, and then examined under the microscope. Vigorous and persistent local treatment is required. The hair of the affected part should be cut close, and the head washed daily with soap and hot water, or an ointment of oleate of mercury, or of sulphur should be applied twice a day. Treatment must be continued as long as the fungus is present.

Scabies.—The diagnostic features are the presence of the itch mite (acarus scabiei) and its burrows. The eruption is multiform and generally on the flexor surfaces of the body, and the itching is intense and is worse at night. *Treatment* consists of a hot bath, followed by the application of sulphur ointment (one dram to the ounce of petrolatum) every night for a week; the bed linen and underclothes should be sterilized. After the interval of one week treatment must be undertaken again for a week.

5. The common types of cerebral growths are the tubercle, gumma, sarcoma, carcinoma, and cysts. The general symptoms are those of apoplexy: There may be prodromal symptoms such as vertigo, pain in the head, or impairment of memory; but as a rule the attack is sudden with vertigo and unconsciousness; there may be retention or incontinence of urine, the urine has



a high specific gravity and may contain albumin; hemiplegia generally ensues; the tongue protrudes toward the affected side; aphasia (either motor or sensory) may be present; the face is flushed, breathing is stertorous; the body temperature is first subnormal and then elevated; the pulse is slow and full; in severe cases the pulse becomes weak, and the respirations become of the Cheyne-Stokes type; the reflexes are abolished.

If the tumor is in the prefrontal region, there may be no symptoms at all, or mental enfeeblement, disturbances of smell and vision, motor agraphia and aphasia.

6. A complete physical examination should be made, noting especially the condition of the heart, arterial walls, and abdominal organs; the diastolic blood pressure should also be obtained; the urine should be examined, noting the specific gravity, 24 hours quantity, presence of sugar and indican, and the amount of urea excreted; the patient should be questioned about the amount of rest, exercise, and recreation (including vacation) which he takes; the eyes should be examined by a competent oculist and any errors of refraction should be corrected; a Wassermann test should be made.

The *diagnosis* lies between nervous fatigue, eyestrain, simple hypertension, gastrointestinal autointoxication, arteriosclerosis, chronic interstitial nephritis, and syphilis. *Prognosis.* If the condition is dependent upon causes which may be removed, the prognosis is fairly good so long as there are not marked changes in the bloodvessels. With organic arterial changes there is danger that these symptoms may be precursors of cerebral hemorrhage or thrombosis, in which case the outlook for future health and usefulness is bad, and for life doubtful. *Treatment.* The *indications* are:—For *gastrointestinal autointoxication,* the diet must be regulated, the total amount limited, and the quantity of proteids restricted; laxatives, especially salines, should be given. For *nervous fatigue,* more sleep, or a vacation may be required. *Syphilis* requires cautious treatment with mercury, arsenic and potassium iodide. *Arteriosclerosis* requires a restricted diet (as just given for autointoxication), also potassium iodide (10 grains, three times a day) for a long period, nitroglycerin (gr. 1/100 to 1/50) may be tried, and if no bad effects are noticeable in heart, circulation or urine, it may be used as required; sodium nitrite may be used instead; the patient should avoid overeating, constipation, and exposure to chills, and he should limit his business activities (at least for a time); alcohol and tobacco should be limited to the smallest amount compatible with

physical comfort, and beer and heavy wines should be avoided. Moderate exercise as walking, golf, etc., should prove beneficial. *Chronic interstial nephritis* requires the same treatment as just outlined for arteriosclerosis, but in addition it might be advisable to avoid red meats.

SURGERY.

1. In fracture of the spine in the lower dorsal region, there will be paralysis of the muscles of the lower limbs, with total anesthesia of legs and gluteal and perineal regions; there may be paralysis of the bladder or retention of urine with overflow, according as the vesical center is or is not involved; there will be incontinence of the feces. The extent of the paralysis and anesthesia depend on the lesion to the cord; if only one side of the cord is affected, only one limb will be paralyzed and anesthetic. The parts immediately above the lesion are hypersensitive, and there is a zone of pain around the body ("girdle pain"). Bedsores arise on very slight irritation, cystitis usually comes on from septic infection, the temperature and pulse are variable (according to the amount of toxic absorption). "The *treatment* naturally varies with the character of the case. The patient is carefully placed on a prepared bed, the greatest gentleness being used in handling and lifting him, for fear of increasing the damage to the cord. The bed must be firm though not hard; perhaps the best type to employ is a horsehair mattress placed over fracture boards; nothing more soft or yielding is permissible. Spring beds and wire-wove mattresses are most undesirable. A water-bed is required in the later stages, but should not be used at first, as it is scarcely firm enough. The shock resulting from the accident is treated in the usual way by warmth and, if need be, by stimulants; but it must be remembered that anesthetic regions of the body can be easily blistered or burnt by hot-water bottles, unless carefully guarded by flannels. When reaction has occurred, a more thorough examination of the patient can be made, and the subsequent course of action decided on. In many cases, as soon as the patient is laid flat on a bed, the displacement remedies itself, especially if the spine has been comminuted, and then the treatment must be *symptomatic*, as also after reduction or operation, where the paraplegia persists or is only slowly recovered from. He is kept in bed, absolutely flat, and with the head low; perhaps some form of mechanical support—*e. g.*, a plaster of Paris or leather jacket—may be considered advisable; but its application is always a matter of difficulty, and

in the early stages it does but little good. Food is regularly administered, and at first must be light and readily assimilable. The chief care of the attendants must be directed to the skin, bladder, and bowels."—(Rose and Carless' *Manual of Surgery*.)

Indications for operation (laminectomy).—When the cord is not completely severed; in fractures of the arches alone when the cord is pressed upon; when the paraplegia comes on slowly, after an interval. When there is complete local destruction of the cord no operation should be done.

Laminectomy.—"The patient is placed either prone or lying on his left side with a pillow supporting the chest, and the spinous processes of the vertebræ to be dealt with are exposed by raising a rectangular flap of skin and fascia. When there are signs of fracture of the neural arches, the center of the flap should lie over the broken vertebræ. When there are no signs of fracture, the site of the incision is determined by the spinal symptoms. The muscles, along with the periosteum, are separated from the spines and laminæ, and the hemorrhage, which is often very free, is arrested by pressure and forceps. The interspinous ligaments are then divided with scissors, and the spines snipped off at their bases with bone pliers. The ligamenta subflava are next divided close to the bone and the laminæ sawn across and levered out, or cut away with rongeur forceps. The fatty tissue outside the dura is separated, and any veins that are torn are tied. The extra-dural space is now examined by pushing aside the dura with the enclosed cord, and any blood clots or fragments of bone which may be present are removed. If it is necessary to open the dura, it should be securely sutured again to prevent leakage of cerebrospinal fluid. The divided muscles are brought together with catgut sutures, but, as there is usually a good deal of oozing for some hours after the operation, a drainage tube should be inserted down to the gap in the bone, and left in position for forty-eight hours. Special care must be taken to avoid soiling of the dressings by discharges from the paralyzed bowel and bladder."—(Thomson and Miles' *Surgery*.)

2. *Removal of the kidney may be advisable* in extensive tuberculous disease of the kidneys, calculous pyonephrosis, hydronephrosis, malignant disease, and rupture of ureter or kidney if complications are present. In any case, before deciding to remove one kidney it must be positively ascertained that the patient has another kidney capable of performing its functions.

Tuberculosis of the kidney shows polyuria, acid urine which may contain pus or blood, the sediment may contain tubercle bacilli. If no tubercle bacilli are found microscopically, some of the sediment injected into a guinea pig will cause tuberculosis in that animal. Cystoscopic examination with catheterization of ureters will show which kidney is affected, and tuberculous ulcers in the bladder may also be detected close to the ureteral orifice.

Malignant disease of the kidney gives hematuria, pain in loin and thigh, and emaciation. A tumor may be palpable. Cystoscopic examination gives none of the features noted above, and there are no tubercle bacilli in the urine.

Nephrectomy.—"The abdominal operation is chiefly utilized when the organ is much enlarged, on account of the readier access obtained, especially to the pedicle. The peritoneum is likely to be opened, and may be exposed to septic contamination, when the pelvis and the upper part of the ureters are distended with decomposing pus, as is frequently the case; but this is easily prevented. Drainage is obtained for the cavity left after the removal of the organ by a counter opening made through the loin. One great advantage is that the other kidney can be first examined, if required, and its condition ascertained. As to the technique, there is frequently no necessity to open the peritoneal cavity, since the kidney is almost always enlarged, but an opening is often made, intentionally or accidentally. The colon and peritoneum are peeled off the organ and displaced inwards; it is then freed from its adhesion to surrounding tissues, the surgeon endeavoring to keep outside its true capsule, but inside the layer of condensed perinephric tissue. Special precautions must be adopted in dealing with the deep aspect of the tumor, particularly on the right side, where it is occasionally adherent to the inferior vena cava. The mass is now lifted from its bed, and its pedicle, consisting of the ureter and renal vessels, isolated. These latter are secured separately by ligature and divided, a clamp being applied to the distal ends. The ureter is dealt with in the same way, small pieces of gauze being packed around so as to receive any secretion which may escape; the exposed mucous membrane in the portion which is left is carefully touched over with pure carbolic acid. The kidney thus freed is removed, and the wound in the abdominal parietes closed in the usual way, provision for drainage having been previously made either through the loin or from the front. Considerable shock is often

experienced from this operation and the death rate is somewhat high. Occasionally the perinephric adhesions are so firm and extensive that the only practicable plan of removing the organ is to enucleate it from within the capsule as far as the hilum; the capsule is then torn or cut through so as to expose the pelvis and renal vessels, which are secured."—(Rose and Carless' *Manual of Surgery.*)

3. ULCER OF THE STOMACH. *Symptoms.*—Pain, which is intermittent in character, localized in the stomach, and coming on soon after a meal; vomiting, which also occurs soon after eating, and often relieves the pain; hematemesis is common; examination of the gastric contents shows an excess of free hydrochloric acid.

It is to be *differentiated from* cancer of the stomach, duodenal ulcer, gastralgia, gastritis, pylorospasm, hypersecretion, cholecystitis, cholelithiasis, and renal calculus.

Operation is indicated when the hemorrhage is copious and recurrent, when medicinal treatment has been given a fair trial and no cure has been made, when after apparent cure a relapse has occurred, when perforation occurs, when adhesions about the stomach interfere with the proper performance of its functions.

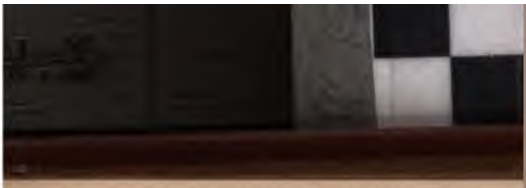
Posterior gastroenterostomy.—"The abdomen is opened by a vertical incision to the right of the middle line above the umbilicus. The stomach, transverse colon, and omentum are drawn out of the wound and turned upward, and an opening is made in the mesocolon near its root, so as to expose the posterior surface of the stomach; a portion of stomach at the lowest part of the greater curvature is selected for the anastomosis. The upper part of the jejunum is then found by passing the fingers along the under surface of the mesocolon immediately to the left of the spine, and the highest available portion of it brought into contact with the stomach in such a way that the loop of bowel selected runs from right to left (Mayo). An anastomosis is then made between the stomach and jejunum, an ellipse of mucous membrane being excised from each viscus. The edges of the opening in the mesocolon are then stitched over the line of junction, so as to bury it and prevent any hernial protrusion through the gap. After being cleansed, the viscera are replaced in the abdomen, and the wound in the parietes closed. When the patient has recovered from the anesthetic he is propped up in bed with pillows."—(Thomson and Miles' *Surgery.*)

4. *Symptoms of strangulated hernia: General.*—

"Severe pain comes on suddenly after some effort, at first referred to the umbilicus, and subsequently to the site of the hernia. This is accompanied by some shock. The pulse is weak, and, though slow at first, becomes rapid; the skin is cold and clammy; vomiting occurs, and soon becomes frequent and fecal-smelling. Constipation is complete, though both feces and flatus may be passed at first from the lower bowel. The patient generally becomes exhausted from the vomiting and inability to take food. When gangrene occurs the temperature becomes subnormal, the pulse very rapid and weak, and the patient dies of toxemia from the general peritonitis which follows gangrene. *Local.*—A tumor forms at one of the hernial sites; or more often the patient has been the subject of a hernia, which he now finds to be irreducible, tense, tender, and without impulse on coughing. If allowed to persist the sac and coverings become gangrenous."

Treatment is taxis or operation. "Operative treatment should be undertaken at once when gentle taxis has failed. An incision is made over the sac, which is then opened. There is usually fluid in the sac, so there is no danger of wounding the gut. The fluid is washed away, then the cause of strangulation is made out, and a hernia knife guided up to it by a finger or broad hernia director. The constriction is nicked in one or two places and the gut is drawn down so that the site of strangulation may be examined. Omentum is ligatured and removed. If the patient is profoundly collapsed and will not bear a prolonged operation, an artificial anus is established by dividing the constriction outside the sac, so as not to open the peritoneal cavity. The loop of bowel is then opened to give free exit to the feces. Most of the cases which have to be treated in this way are so bad before treatment is commenced that a fatal termination must be expected. If the patient can possibly stand it, immediate resection gives the best chance, and with Murphy's button or a bobbin much time can be saved. A radical cure is advisable after the strangulation has been relieved, unless the patient's condition contraindicates it. Liquid food is given at the end of twenty-four hours, and the bowels need not be disturbed for five or six days, when castor oil may be given."—(*Aids to Surgery.*)

5. *Symptoms of fracture of the middle of the femur.*—History of injury; disability; pain on movement; preternatural mobility; crepitus; shortening of the limb, deformity (simple overriding of fragments, or angular deformity). The lower fragment is drawn



upward and inward, and may be either in front of or behind the upper fragment; the ends of the fragments can be felt by the surgeon. The thigh and leg are slightly flexed and, generally, everted.

Treatment: "The limb is carefully washed and, if hairy, shaved. Two long strips of strapping, three inches wide, fixed below to a square piece of board ¼ to ½ inch thick (slightly wider than the ankle opposite the two malleoli), which is known as the stirrup, are heated and pressed against the lower third of the fractured limb. They are here secured by short, thin pieces of strapping 1 to 1½ inches in width, passed in a figure of 8 around the limb above the malleoli and ending just below the fracture; the knee may be left uncovered. It is necessary to see that the pull of the extension is exerted on the femur and not on the knee. Large pads of wool should be introduced between the malleoli and the sides of the strapping, to prevent the skin over these processes becoming chafed. A cord is fixed to the stirrup and passes over a pulley at the end of the bed, and is there secured to a tin can which is filled with shot up to the required weight. If now the foot of the bed is raised on blocks, extension and counterextension are obtained, the patient's body acting as a counter-extending weight. When the fracture has been manipulated into a good position under an anesthetic (it is always necessary to control the fracture with some splints before the anesthetic is given), the extension apparatus is applied, and Liston's splint is bandaged to the limb. A proper splint of this kind should extend from the axilla to below the foot, and it is secured to the patient in three places: (1) round the thorax, (2) round the limb at seat of fracture, and (3) to the leg and ankle. In securing the thorax it is necessary to take the first turn of the bandage round the splint from within outward, and then round the back of the patient's thorax, the direction of the bandage in this way preventing the natural tendency of the splint to rotate forward. Several turns should be taken round the thorax in order to retain it in position. The remaining bandages should be secured from without inward, in order to check the tendency of the foot and leg to roll outward. In order to prevent the rotation of the limb a method devised by Cheyne and Burghard may be adopted. This consists in securing the limb at the level of the popliteal space to a short splint, 8 by 4 inches, by means of a plaster of Paris bandage. The presence of this splint effectually prevents any rotation, either inward or outward. Special care must be taken

to see that the malleoli and the skin over the heel are not subjected to any great pressure. If the fracture is put up in this way it must be kept up for six to eight weeks, and the amount of weight applied to the limb must be varied according to the age of the patient and the tendency to deformity. Roughly half a pound a year will be found to answer most purposes, but if there is much spasm the amount can be increased up to 20 pounds. At the end of six weeks, during which period the limb should have been regularly massaged—this can usually be done without disturbing the extension—the patient should be got up, and some form of retentive apparatus applied. A Thomas's splint is a very valuable form of apparatus, since it enables the patient to get about, and allows of active movements being undertaken, while he himself can hobble about on crutches. If such treatment is not considered advisable, he should be kept in splints for eight weeks, and then allowed to lie in bed without any apparatus on at all, while the limb is regularly massaged, and he should be encouraged to get up for a short time on crutches, gradually exercising the limb, until at the end of about ten weeks he is walking on it as before."—(Pye's *Surgical Handicraft*). Some surgeons advise immediate operation, and cut down on to the fractured bone and, after reduction, fix the fragments by two or three Lane's plates.

OBSTETRICS AND GYNECOLOGY.

1. CYSTITIS.—*Causes:* Retention of urine, tumors, foreign bodies, calculus, ammoniacal urine, various pathogenic bacteria producing (for example) gonorrhea, tuberculosis of genitourinary tract, pus in the urine. *Symptoms:* Frequent urination, with tenesmus and a burning sensation in the urethra; later on pain in the bladder, hematuria, and the urine contains pus and epithelial cells. Chills, fever, rapid pulse, and headache may also be present. A feeling of weight or pain in the pelvis is noticed. *Treatment:* Rest in bed; the imbibition of plenty of milk and water, and the avoidance of all highly seasoned food; laxatives; diuretics; sitz-bath; irrigation of the bladder with an antiseptic solution; hot fomentation and vaginal douches are often helpful; sometimes intravesical medication is necessary.

2. (*a*) *Operation for recent laceration of the perineum.*—"The parts are cleansed and a pledget of sterile cotton or gauze pushed up the vagina to stop any flow from the uterus obscuring the wound. The sutures

(preferably of aseptic silk) are passed with a moderately curved needle about 2 inches long as follows: Beginning at the posterior end of the laceration (that nearer the anus), the needle enters the skin near the edge of the wound and follows a circular course until its point appears at the very bottom of the laceration (a finger of the other hand in the rectum guarding against its penetrating that canal); it then enters the opposite side of the laceration at the bottom of the wound and comes out of the skin opposite its point of entrance, having followed a similar circular course to that pursued on the other side where it first went in. The ends are *loosely* tied or secured by catch-forceps, until the requisite number of sutures are passed in a similar manner (half an inch apart), when the wound is again cleansed, the vaginal plug removed, and the sutures tied tightly enough to coapt the parts without injurious constriction, the order of succession in tying being that in which the sutures were passed.

In "complete" lacerations—those of the third degree—through the sphincter ani to the rectum, the operation is more difficult. The rectal tear is first stitched with *catgut* sutures (a short, curved needle being used) and going through the rectal wall only. The sutures are tied on the inside, so that the knots are on the mucus membrane of the bowel. They begin from above and come down to the sphincter ani, the cut ends of which are drawn out with a tenaculum while the sutures penetrate them. These *catgut* sutures need not be removed; they will digest in the tissues and disappear of themselves. The posterior wall of the vagina is next sutured with fine silk, from above downward toward the hymen. Finally, skin sutures through the perineum itself, including muscles of the pelvic floor (as just described for lacerations of the first and second degrees) complete the operation. The silk sutures may be removed in about a week. Antiseptic dressings are applied as after an ordinary labor, extra care being taken to keep the wound aseptically clean by daily irrigation with the creolin solution."—(King's *Obstetrics.*)

(*b*) *Operation for old laceration of the perineum.*—"Lateral tears are best repaired by the Emmett operation. With the patient in the lithotomy position, guide sutures or tenacula are passed through the apex of the rectocele and through each labium majus at the lowest carnunculæ myrtiformes. By drawing on the lateral suture and pulling the central suture downward and to the opposite side, the lateral sulcus appears as a triangle with the apex up in the vagina. This tri-

angle is denuded of mucous membrane by cutting off long strips by means of forceps and scissors, or by dissecting the mucous membrane off in one piece. The triangle on the opposite side is treated in the same manner, and the denudation completed by removing the mucous membrane between the bases of the triangles and below the central suture. Each lateral triangle is closed by interrupted sutures of chromicized catgut or silkworm gut, the latter being shotted. The needle, which should be curved, is entered near the margin of the wound on the outer side, passed deeply to catch the fibers of the levator ani, and brought out at the bottom of the sulcus, at a point nearer the operator; it is then reinserted at the bottom of the sulcus, and passed upward and backward in the rectocele, to emerge opposite the point of the original insertion. The opposite triangle is treated in the same manner, which leaves a small raw area externally to be closed. The upper or "crown stitch" passes through the skin of the perineum below the lateral guide suture, then through the rectocele below the central guide suture, and finally through the tissues below the opposite guide stitch. As many sutures as may be necessary are inserted below this. If silkworm gut is used, the stitches should be removed on the tenth day. The external genitals are irrigated with weak bichloride of mercury solution after each urination; catheterization should, if possible, be avoided. The bowels are moved on the second day. Internal douches are not needed unless there be infaction. The patient should be kept in bed two weeks, and heavy work and sexual intercourse forbidden for three months."—(Stewart's *Surgery*.)

(*c*) The chief difference between the two operations, is that in the *recent* condition denudation is unnecessary (except for the possible trimming off of any ragged edges of the wound).

3. The conditions which may be mistaken for pregnancy are, uterine fibroid, ascites, ovarian cyst (or other tumor), fat, pseudocyesis, and subinvolution of the uterus.

Pregnancy.—Positive signs of pregnancy: Hearing the fetal heart sound; (2) active movement of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation; and (5) the umbilical or funic souffle. *Doubtful signs of pregnancy:* (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4) uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness.

Further, in pregnancy the tumor is hard and does not fluctuate, it is situated in the median line, the cervix is soft, the rate of growth of the tumor and the general condition of the patient's health may help in arriving at a diagnosis.

Uterine fibroid.—Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, but sometimes extending over years.

Ascites.—Absence of the signs of pregnancy; the abdomen is distended, but the shape varies with the position of the patient; on lying down there is bulging at the sides, the tumor fluctuates, and percussion shows dullness in the flanks, with resonance in the median line, but the dullness varies with the position of the patient.

Ovarian cyst.—Absence of the chief signs of pregnancy; there may be the characteristic facies. the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

Fat.—Absence of signs of pregnancy, also of fibroid, or ascites.

Pseudocyesis.—The uterus is not enlarged, and the administration of a general anesthetic causes the collapse of the "tumor."

Subinvolution of uterus.—The uterus does not increase in size, there is a leucorrhea, there is generally pain in the back or ovarian region, there is a history of irregular (and profuse) menstruation, and the signs of pregnancy are absent.

4. *Accidental hemorrhage* is the hemorrhage which occurs when a normally situated placenta separates (partially or completely) from its uterine attachment. The prognosis depends upon the recognition of the condition. If there is an external flow of blood, and the condition is recognized and treated promptly, the prognosis is guardedly favorable; if there is no external flow of blood, but the hemorrhage is concealed, the prognosis is very grave, for the diagnosis may not be made sufficiently early to allow of adequate treatment. In this form, the maternal mortality is at least 50 per cent., and the fetal death rate is 90 per cent. *Treatment:* "The chief indication is to evacuate the uterus as speedily as possible, so that the uterine muscle will contract and close the bleeding sinuses. If the bleeding is slight no immediate intervention may be required ex-

cept to rupture the membranes. The patient should be kept under close observation, and in bed. Chloride of calcium, gr. xx every three hours, is useful by promoting coagulability of the blood. A very tight abdominal binder and an icebag upon the lower abdomen may help. Generally in either variety of hemorrhage the cervix should be dilated manually. After full dilatation the delivery is rapidly completed by forceps or version, or in dead or nonviable fetus by embryotomy. Firm compression of the uterus is maintained manually by a skilled assistant during delivery. Precautions should be taken against postpartum hemorrhage. When the cervix resists manual dilatation and immediate delivery is urgently demanded, vaginal cesarean section may be performed. The effects of blood loss are combated as in other hemorrhages."—(Polak's *Manual of Obstetrics.*)

5. In the first four or five days the discharge is bloody in character, and is called the *lochia rubra*; it consists of placental tissue, decidua, blood, epithelial cells, mucus, and microorganisms. For the next two or three days the discharge is serosanguinolent, and is called the *lochia serosa*; then for two or three weeks or until the endometrium is regenerated, the discharge becomes creamy, and contains fat, cholesterin, epithelial cells and leucocytes; during this period it is called *lochia alba.* The discharge has a peculiar fleshy smell, something like fresh blood. Ordinarily the lochia continues for from two and a half to five weeks. *Suppression of lochia* may be due to infection or to obstruction of the outflow. *Prolonged continuance of the lochia* may be due to subinvolution of the uterus, posterior displacements of the uterus, and retained secundines; the condition is more common in multiparæ than in primiparæ.

STATE BOARD EXAMINATION QUESTIONS.

Medical Council of Canada.

ANATOMY.

1. Describe the urinary bladder, including its attachments, its blood and nerve supply.
2. Describe the nasal fossæ and adjoining air sinuses.
3. Give fully the location and relations of the spleen.
4. Describe accurately the origin, course, relations, and terminations of a typical intercostal artery.
5. Describe the radiocarpal joint, including bones, ligaments, synovial membrane, movements, and relations.
6. Give fully the relations of the trachea.

MEDICAL COUNCIL OF CANADA.

PHYSIOLOGY.

1. Describe the mechanism which brings about the reflex secretion of submaxillary saliva. What are the histological differences between an active and a resting salivary gland?

2. Describe the effect of fatigue upon the contraction of skeletal muscle, drawing muscle curves to elucidate your answer. Discuss the cause of muscular fatigue.

3. How is blood pressure measured in the human being? Explain by what means general blood pressure may be raised and lowered, and also how local blood pressure may be altered.

4. Describe the structure of the skin. Explain how the different sensory areas of the skin have been mapped out. Trace the pathway of the different nerve impulses from the skin areas to the cerebral and cerebellar cortex.

5. Distinguish the different kinds of white blood cells and specify their function.

6. What changes does the uterus undergo during menstruation?

PATHOLOGY AND BACTERIOLOGY.

1. What is meant by agglutinins, precipitins, opsonins, and anaphylaxis?

2. What do you understand by edema, anasarca, ascites? What are the causes of these conditions?

3. Describe fully the morbid changes in the lungs in (*a*) acute lobar pneumonia, and in (*b*) acute lobular pneumonia.

4. Give the pathological-anatomical forms of acute endocarditis, their situation, and their pathogenesis.

5. Write what you know of the *Bacillus diphtheriæ*.

6. What are "carriers"? Mention the diseases that are admittedly due to the influence of the "carrier"?

HYGIENE AND PUBLIC HEALTH.

1. Define (*a*) Terminal disinfection; concurrent disinfection; (*b*) Which is the more important, and why? (*c*) Describe in outline one good method for each; (*d*) In what diseases have (i) terminal disinfection, (ii) concurrent disinfection, been proved of value in reducing their spread?

2. (*a*) Describe clearly the different methods through which insects transmit disease, with a specific example of each method; (*b*) Suggest the best method to get rid of (i) flies, and (ii) malaria mosquitoes.

3. (*a*) Define the term "carrier"; (b) Mention those

diseases which are spread by carriers; (*c*) Describe proper measures for control of carriers.

4. In case of impure water not corrected by municipal authorities describe different household measures which may be taken to successfully purify the water for consumption.

5. State what you know of the cause, mode of transmission, and means of prevention of the following diseases: whooping cough, diphtheria, typhoid, typhus fever, tetanus, acute anterior poliomyelitis, ophthalmia neonatorum, smallpox.

6. (*a*) What ill effects may be produced by (i) cold, (ii) heat? (*b*) What preventive measures may be used against them? (*c*) What ill effects may be produced by dampness in a house? (*d*) What measures may be used to prevent such dampness?

OBSTETRICS AND GYNECOLOGY.

1. Abortion: (*a*) Define the terms "threatened," "inevitable" "complete" and "incomplete" abortion; (*b*) Describe briefly how you would deal with each of these conditions.

2. What symptoms would lead you to suspect ectopic gestation? How would you diagnose the condition?

3. Forceps in occipotoposterior position of the head: Describe application and extraction.

4. What are the indications and the means of inducing labor and immediate delivery?

5. Fibroids of the uterus: Classify as to localization and give the symptoms of each class.

6. Discuss the causes and treatment of dysmenorrhea in the virgin.

SURGERY.

1. Fracture of patella: Causes, symptoms, and modes of treatment.

2. Dislocation of the Hip Joint: Varieties, symptoms (clinical features), and modes of reduction.

3. Carbuncle: Definition, pathology, symptoms, diagnosis, complications, and treatment.

4. The pathology and symptoms of tuberculosis of the kidney: Outline your method of examination, with findings, leading to a diagnosis.

5. Cholelithiasis: Diagnosis, complications, and treatment in detail.

6. Give the history, clinical features, and treatment in detail of a typical case of middle meningeal hemorrhage.

MEDICAL COUNCIL OF CANADA.

MEDICINE.

1. Discuss the important points in the differential diagnosis of cardiac dilatation and pericardial effusion.

2. How would you establish a differential diagnosis between (*a*) acute lobar pneumonia, (*b*) congestion (active) of the lungs, (*c*) acute pneumonic phthisis?

3. Write what you know about (*a*) the etiology and (*b*) the diagnosis of epidemic cerebrospinal meningitis.

4. How would you treat a case of typhoid fever complicated by intestinal hemorrhage, giving (*a*) the hygienic, (*b*) the dietetic, and (*c*) the medicinal treatment?

5. Describe the method of giving salvarsan. Discuss the dosage of the remedy, pointing out the indications for its use.

6. A woman aged fifty-one years was seen in a restless state, with twitching of muscles. She was slow in answering questions or obeying orders. Her speech was rather thick. There was no fever. The pulse was regular and of high tension (200+). There was no cough, cyanosis, nor edema. The pupils were equal with normal reflexes, while the tendon reflexes were greatly exaggerated. There was no paralysis. The history showed that the patient had suffered recently severe headaches with frequent vomiting. Recently also her strength had failed and she occasionally complained of severe præcordial pain, yet no pericardial signs were made out. The urine had been free from albumin but now contained blood. The Wassermann was negative. Kernig and Babinsky signs were absent. Discuss the diagnosis and point out further clinical methods useful in establishing a diagnosis.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

MEDICAL COUNCIL OF CANADA.

ANATOMY.

1. The *urinary bladder* is a hollow musculo-membranous viscus, situated chiefly in the pelvic cavity, but when fully distended it extends into the abdominal cavity. It lies behind the pubes and the rectum in the male, and between the pubes and cervix uteri and upper part of the vagina in the female. On the inside, three openings are observed, the two ureteral openings behind and that of the urethra in front; the space between these openings is called the trigone. The peritoneum covers the superior surface of the bladder and

extends for a variable distance over the anterior surface; that part of the anterior surface which is not covered by peritoneum is called the prevesical space of Retzius. Most of the posterior surface is covered by peritoneum. The *attachments* are a number of ligaments, five true and five false ones; the true ones are two anterior or puboprostatic, from the back of the os pubis to the front of the neck of the bladder; two lateral, which are expansions of the pelvic fascia; and the urachus, extending between the summit of the bladder and the umbilicus. The false ligaments are peritoneal folds; two posterior, from the back of the bladder to the rectum in the male and the uterus in the female; two lateral, from the iliac fossæ to the sides of the bladder; and one superior, from the summit of the bladder to the umbilicus. In addition, the bladder is attached to the ureters, urethra, and rectum; also to the prostate in the male, and to uterus and vagina in the female. The *arteries* are the superior, middle, and inferior vesical, and branches from the obturator and sciatic, all from the internal iliac; in the female, there are additional branches from the uterine and vaginal arteries. The *veins* form plexuses around the neck, base, and sides of the bladder, and end in the internal iliac vein. The nerves are derived from the hypogastric plexus of the sympathetic, and from the third and fourth sacral nerves.

2. The *nasal fossæ* are two irregular cavities situated in the middle of the face. They open in front by the anterior nares, and behind into the nasopharynx by the posterior nares. They are separated by the septum, which is generally deviated to one side. The mucous membrane lining the nasal fossæ is called the Schneiderian membrane. Each fossa has a roof, a floor, an inner and an outer wall. From the outer wall there project into each fossa the superior and middle turbinated processes of the ethmoid bone, and the inferior turbinated bone; these bony processes divide each fossa into a superior, middle, and inferior meatus. The nasal fossæ communicate with the sphenoidal sinus, the anterior and posterior ethmoidal cells, the frontal sinus, and the antrum of Highmore.

The *roof* is formed by the ethmoid, nasal, frontal, sphenoid, vomer, and palate bones; the *floor* is formed by the maxillary and palate bones; the *outer wall*, by the nasal, maxillary, lacrymal, ethmoid, inferior turbinated, palate, and sphenoid bones; the *inner wall*, or *septum*, by the ethmoid, vomer, frontal, nasal, sphenoid, maxillary and palate bones, and septal cartilage.

The *antrum of Highmore* is situated in the body of the superior maxillary bone, is pyramidal in shape, its apex being at the malar process and its base forming the external wall of the nasal cavity. Above it is covered by the orbital surface of the maxilla, and below by the alveolar border. Its walls are lined with mucoperiosteum which is continuous with the mucous membrane of the middle meatus of the nose.

The *frontal sinus* is found between the two layers of bone in the vertical part of the frontal bone. The two sinuses are separated by a thin septum. The cavity is lined with mucoperiosteum which is continuous with the middle meatus of the nose.

The *ethmoidal cells* are situated in the lateral mass of the ethmoid bone; the anterior cells open into the middle meatus of the nose, and the posterior cells into the superior meatus.

The *sphenoidal sinuses* are situated in the body of the sphenoid bone immediately below the fossa which lodges the pituitary body; they are separated by a septum, and open into the superior meatus of the nose.

3. The *spleen* is situated in the upper and left side of the abdominal cavity; it lies far back in the left hypochondriac region, behind the stomach. It lies above the left kidney and the splenic flexure of the colon. It is surrounded by peritoneum except at the hilum. Above and externally are the peritoneum, diaphragm, left ninth, tenth and eleventh ribs, left lung and pleura, and posterior thoracic muscles. Below, the splenic flexure of the colon, costo-colic ligament, and (sometimes) the tail of the pancreas. Internally, the stomach (posterior surface of the fundus), left kidney and suprarenal capsule, and tail of the pancreas.

4. INTERCOSTAL ARTERIES. "(*a*) The *vertebral portions* of the intercostal arteries, arising in pairs from the posterior part of the thoracic aorta, pass around the vertebræ—the right being covered by thoracic duct, vena azygos major, pleura, lung, esophagus—the left, by vena azygos minor, left superior intercostal vein, third vena azygos, pleura, lung. The arteries here divide into posterior or dorsal, and anterior or intercostal branches. (*b*) The *intercostal portions* run forward and obliquely upward in the intercosal space to the lower border of the superior rib, and divide near the angle of the rib into the upper (larger) and lower (smaller) branches—the former, to run in the groove along the lower border of the upper rib and anastomose with the superior intercostal branch of the internal mammary in the upper spaces, and of the musculo-

phrenic in the lower—the latter, to run along the upper border of the lower rib and anastomose with the inferior branch of the internal mammary in the upper spaces, and of the musculophrenic in the lower. At first these arteries lie between pleuræ, lungs, endothoracic fascia, and infracostals internally—and external intercostal muscles externally—then (from the angles of the ribs) between the external and internal intercostal muscles. The sympathetic nerve crosses them opposite the head of the ribs. The intercostal vein lies above and the intercostal nerve below the intercostal arteries—except in the upper spaces."—(Bickham's *Operative Surgery.*)

5. The *radiocarpal joint* is formed by the under surface of the radius and a triangular plate of fibrocartilage, which together form a shallow socket for the scaphoid, semilunar, and cuneiform bones. The ulna does not take part in this articulation. The ligaments are the anterior, posterior, internal and external. The *anterior ligament* extends from the lower border of the inferior extremity of the radius, and is inserted below into the scaphoid, semilunar, and cuneiform bones. The *posterior ligament* arises from the posterior aspect of the lower end of the radius and is inserted into the scaphoid, semilunar, and cuneiform bones. The *external lateral ligament* extends from the tip of the styloid process of the radius to the scaphoid bone. The *internal lateral ligament* extends from the styloid process of the ulna to the cuneiform and pisiform bones. These ligaments are continuous with each other, and so form a capsule around the joint. The synovial membrane lines the deep surfaces of the ligaments, it is loose and lax and presents numerous folds. The *movements* are those of flexion, extension, abduction, adduction, and circumduction. *Anterior* to the joint are the flexor carpi radialis, palmaris longus, flexor carpi ulnaris, flexor sublimis digitorum, flexor profundus digitorum, and flexor longus pollicis. *Posteriorly*, extensor carpi radialis (longior and brevior), extensor communis digitorum, extensor indicis, extensor minimi digiti, extensor carpi ulnaris. *On the radial side*, the supinator longus, extensor ossis metacarpi pollicis, extensor brevis pollicis, extensor longus pollicis.

6. RELATIONS OF THE TRACHEA. *In the neck. Anteriorly*, the skin, superficial fascia, anterior jugular veins, inferior thyroid veins, thyroidea ima artery, sternohyoid and sternothyroid muscles, isthmus of thyroid gland, thymus or its remains. *Posteriorly*, the esophagus. *Laterally*, the lateral lobes of the thyroid

gland, inferior thyroid arteries, recurrent laryngeal nerves, and the sheath containing the common carotid artery, internal jugular vein and pneumogastric nerve. *In the thorax. Anteriorly*, upper part of sternum, sternohyoid and sternothyroid muscles, thymus or its remains, left innomimate vein, transverse part of the arch of the aorta, innominate artery, left common carotid artery, deep cardiac plexus, and left recurrent laryngeal nerve. *Posteriorly*, the esophagus. *Laterally*, the pleuræ, pneumogastric nerves.

PHYSIOLOGY.

1. The salivary glands have a double nerve supply, from the sympathetic and from the cranial nerves. The submaxillary gland receives its sympathetic fibers from branches of the cervical sympathetic which ramify on the facial artery, and its cranial fibers from the chorda tympani nerve. These fibers run for a short time with the lingual nerve, and then leave it as a slender nerve which, reaching Wharton's duct, runs along this to the gland. The fibers are connected in the hilus of the gland with nerve cells. A small collection of nerve-cells—the submaxillary ganglion—is found in the triangle between the chorda tympani nerve, lingual nerve, and duct. Different effects are obtained according as the chorda tympani or the sympathetic fibers are stimulated. Stimulation of the chorda tympani in the dog gives rise to an active dilatation of the vessels of the gland, and a copious watery secretion containing only a small amount of mucin and formed elements. Stimulation of the sympathetic causes constriction of the vessels and a scanty flow of very thick viscid saliva, rich in mucin and formed elements. The changes that occur in the cells are much more marked under sympathetic than under chorda stimulation. In consequence of the differences in the action of these two sets of nerve fibers, they have been supposed to have two distinct functions. The chorda fibers are vasodilator and secretomotor of water; the sympathetic fibers are vasoconstrictor and secretomotor of organic matter. According to Langley the action of the gland fibers of the sympathetic and the chorda tympani nerve are probably identical, the differences in the saliva obtained by the stimulation of the two sets of nerves being conditioned by the concomitant vascular changes. Against this view may be urged the fact that while atropine paralyzes the secretory fibers of the chorda tympani, it has practically no effect on those derived from the sympathetic. The center for the secretion of saliva

is located in the medulla. In the resting condition of the gland, the acini are seen to be distended with large cells having clear hyaline contents, so close together that no lumen can be seen. The nuclei situated at the outer border of the cells, near the basement membrane, appear shriveled, with irregular margins. In a gland that has been actively secreting for some time, the acini and the cells are smaller, the lumen quite distinct, and the nuclei round and swollen. The section appears darker from the fact that the cells have taken up the staining fluid more readily.—(From Starling's *Elements of Human Physiology.*)

2. *Effect of fatigue upon the contraction of skeletal muscle*: "At first the contractions improve, each being a little higher than the preceding; this is known as the beneficial effect of contraction, and the graphic record is called a staircase. Then the contractions get less and less. But what is most noticeable is that the curves are much more prolonged; the latent period gets longer; and the period of relaxation gets very much longer; this condition is known as contracture, so that the original base line is not reached by the time the next stimulus arrives. In the last stages of fatigue, contracture passes off. Contracture is often absent in fatigue of mammalian muscle. *Cause of muscular fatigue:* This is due to the consumption of the substances available for the supply of energy in the muscle, but more particularly to the accumulation of waste products of contraction; of these sarcolactic acid is an important one. Fatigue may be artificially induced in a muscle by feeding it with a weak solution of lactic acid, and then removed by washing out the muscle with salt solution containing a minute trace of an alkali. If the muscle is left to itself in the body, the blood stream washes away the accumulation of acid products, and fatigue passes off."—(Halliburton's *Physiology.*)

3. Blood pressure is estimated by means of a sphygmomanometer.

"The individual whose blood pressure is about to be recorded should be placed in such a position that his heart, the artery the blood pressure of which is to be determined, and the manometer are at the same level. It is usual to record the pressure in the brachial artery. The india-rubber bag of the instrument should be wrapped around the bared arm, the metal covering of the bag should then be adjusted, and firmly strapped in position. The india-rubber tube leading from the bag is then adjusted to the proximal limb of the U-

shaped manometer which contains mercury. The experimenter places the index finger of his left hand over the radial pulse of the subject, and with his right hand he compresses the syringe and so drives air into the india-rubber tube and the india-rubber bag around the individual's arm. The pressure of the air in the bag around the arm is recorded by movement of the mercury from the proximal to the distal limb of the manometer. The operator keeps on pressing the syringe until oscillatory movements are seen at the surface of the mercury in the distal limb of the manometer; the mean point of maximum oscillations registers the diastolic pressure. If the pressure in the bag is still further increased, the oscillations diminish in amplitude and finally disappear, and at this point the pulse can no longer be felt at the wrist. The height of the mercury supported then registers the amount of systolic pressure. It will then be noted that the mercury has descended in the proximal limb of the manometer, and has ascended in the distal limb of the manometer; the difference between the two mercurial levels will be the blood pressure of the brachial artery. The normal systolic pressure in man is about 120 mm. Hg, and the diastolic pressure about 100 mm. Hg. In women the pressures are about 10 per cent. less. In children the systolic pressure may be as low as 90 mm. Hg, with a diastolic pressure of about 80 mm. Hg."—(R. Hutchison.)

General blood pressure may be *raised* by increase in the rate and power of the heart beat, increase in the contraction of the arterioles, or increase in the volume of the blood. It may be *lowered* by the opposite conditions.

Local blood pressure may be altered by the increase or decrease in the size of the arterioles in areas other than the one under investigation.

4. "The skin is composed of a deep portion, the corium, derma, or true skin; and of a superficial portion, the epidermis or cuticle.

The *corium* makes up by far the greater part of the skin, and within it are the perspiratory glands, the sebaceous glands, the hairs, together with both blood and lymphatic vessels. The upper surface, where it joins the epidermis, is irregular, being composed of elevations—papillæ—and intervening depressions. In some of these papillæ are the tactile corpuscles, in which nerve-fibers end.

The *epidermis* is made up of a deep and a superficial layer. The deep layer (rete mucosum or rete Mal-

pighii) covers the papillæ of the corium and fills the depressions between them. It is composed of cells, round or of different shapes due to pressure of contiguous cells, the material of which they are composed yielding readily. It is in this layer that the pigment is deposited which characterizes the dark races. The superficial layer of the epidermis is composed of cells which are flat and dry or horny."—(Raymond's *Physiology.*)

"The surface of the skin appears to be divided into innumerable small sensory areas, separated by intervals which are not responsive to those stimuli which are only just above liminal intensity. Each of these small areas responds to a specific adequate stimulus, such as pressure, heat, cold, pain. No doubt each area contains a special sensory end organ. The pressure spots, heat spots, cold spots, and pain spots are intermingled, but in some regions one variety predominates, in other regions another variety predominates. The distribution of these spots is by no means uniform. . . . The responsiveness of the skin to external stimuli is investigated by esthesiometers. Pressure sense is estimated by little weights placed upon the skin. Heat and cold sense is investigated by the use of hollow pencil-shaped rods containing hot and cold water respectively, or by using minute drops of water at different temperatures as stimuli. Pain sense is investigated by the use of fine needles. . . . The finer uncrossed tactile sensations pass into the cord at the posterior root zone, and travel up in the column of Burdach and column of Goll. For the most part the impulses from the leg pass up the column of Goll, and those from the arm up the column of Burdach. . . . The coarser tactile sensations, along with the sensations of heat, cold, and pain, travel into the posterior gray cornua, thence into the central gray matter, crossing the cord at the anterior gray commissure. The fibers which convey these impulses appear to make cell stations at the base of the opposite posterior cornua, and from some of these posterior cornual cells new fibers arise which conduct these impulses up the spinal cord through the spinothalamic tract. These impulses eventually arrive at the optic thalamus, and by the thalamo-cortical fibers gain the gray matter of the cerebral cortex. The nerve fibers from the spinal cord, which convey the impulses which eventually give rise to sensations of heat, cold, and pain, travel up through the medulla, external to the olivary body, and in this region they mix with the fibers coming up from the

tract of Gowers. Both these sets of fibers eventually reach the optic thalamus."—(From Lyle's *Manual of Physiology.*)

5. *Varieties of white blood cells:* (1) *Small mononuclear leucocytes* or *lymphocytes*, which are a little larger than red blood cells and consist of a narrow zone of protoplasm around a relatively large and circular nucleus; both nucleus and protoplasm are basophilic; this variety is about 25 per cent. of the total colorless corpuscles. (2) *Large mononuclear leucocytes*, which consist of a relatively small oval nucleus in the center of basophilic protoplasm; the diameter is about 12 to 20 microns, and they constitute about 1 per cent. of total white corpuscles. (3) *Transitional leucocytes* which consist of a smaller cell body than the last, the protoplasm is basophilic and granular, and the nucleus is oval or lobed; they make up about 2 to 4 per cent of the white cells. (4) *Polynuclear leucocytes*, which make up the chief mass of white cells, being about 70 per cent. of the whole; they are about 9 to 12 microns in diameter, and have several nuclei, of different shapes, which are basophilic and granular; the protoplasm is finely granular, and stains with neutral stains and also faintly with acid (eosin) stains. (5) *Eosinophile leucocytes*, which are usually about 12 to 15 microns in diameter and contain two or three nuclei or one nucleus of irregular shape; the protoplasm is granular, and readily stains with eosin or other acid stains; they are about 2 per cent. of the white corpuscles.

Their *functions* are (1) to serve as a protection to the body from the incursions of pathogenic micro organisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

6. *Changes in the uterus during menstruation.* "The endometrium, in the four or five days preceding the flow, becomes rapidly thicker and its superficial layers are congested with blood and, in places, small collections of blood may be noticed. Opinions differ very much as to the change undergone by this thickened membrane during the flow. According to some authors most of the membrane is thrown off and the blood escapes from the denuded surface mixed with pieces of the membrane. According to others, no material destruction of the membrane occurs, the blood that escapes being due to small capillary extravasations or

perhaps mainly to a process of diapedesis. It would seem that the amount of destruction of the endometrium must be subject to individual variations. After the cessation of the flow the mucous membrane is rapidly repaired by regenerative changes in the tissues; the surface epithelium, if denuded, is replaced by proliferation of the cells lining the uterine glands and the thickened, edematous condition of the membrane rapidly subsides during a period of six or seven days. The mucous membrane of the uterus may be said to exhibit a constantly recurring menstrual cycle which falls into four periods: (1) Period of growth in the few (five) days preceding menstruation, characterized by a rapid increase in the stroma, blood vessels, epithelium, etc., of the membrane. (2) The menstruation or period of degeneration (four days) during which the capillary hemorrhage takes place and the epithelium suffers degenerative changes and is cast off more or less. (3) The period of regeneration (seven days) during which the mucous membrane returns to normal size. (4) The period of rest (twelve days) during which the endometrium remains in a quiescent condition."—(Howell's *Text-book of Physiology.*)

PATHOLOGY AND BACTERIOLOGY.

1. *Agglutinins* are antibodies which cause certain bacteria, when suspended in a fluid, to form clumps.

Precipitins are specific antibodies which develop in the serum of animals inoculated with bacteria and which produce a precipitate in a clear solution of the particular culture filtrate against which the animal has been immunized.

Opsonins are substances in normal and immune sera which act upon bacteria and render them more readily available for being ingested by phagocytes.

Anaphylaxis is a condition of hypersusceptibility induced by the injection of a serum. It is (to some extent) the opposite of prophylaxis, and in place of rendering the person injected immune the serum renders him particularly susceptible.

2. *Edema* is an excess of transuded fluid in the interstices of the tissues. When such fluid infiltrates the subcutaneous tissues the condition is called *anasarca.* A collection of such fluid within the abdominal cavity is called *ascites.*

Six factors enter into the production of edema, usually more than one acting at a time, viz., positive pressure in the vessels (in proportion as it rises), permeability of the vessel wall, osmosis from excess of

salts outside the vessel as seen in the action of a saline laxative, selective action of the endothelium, variations in the blood plasma, and obstructed onflow in the lymph channels.

3. ACUTE LOBAR PNEUMONIA. "It is convenient to describe four stages, those, namely, of (1) hyperemia or engorgement, (2) red hepatization, (3) gray hepatization, and (4) resolution. *First stage or splenization.*—The lung is injected, dark red, and heavy, and pits under the finger; on pressure, there exudes a frothy serum tinged with blood and slightly aërated. The lung still floats in water. *Second stage or red hepatization.*—The part involved is solid and friable, presents a granular or red granite appearance, and sinks in water. The alveoli are filled with a coagulated exudation, which shows under the microscope fibrin, leucocytes, red corpuscles, proliferated alveolar epithelium, and pneumococci. *Third stage or gray hepatization.*—The lobe has now the appearance of gray granite, the lung substance is softer and more friable; on pressure, a dirty purulent fluid exudes. The gray appearance is due to four factors: (1) Decolorization of the red blood corpuscles; (2) obliteration of the alveolar blood vessels from pressure; (3) fatty degeneration of the coagulated material; (4) great infiltration of leucocytes. A more advanced stage, in which the lung tissue is bathed in purulent fluid, is known as purulent infiltration. It is probably inconsistent with life. *Fourth stage or resolution.*—Resolution of the inflammatory exudation is brought about principally by absorption (autolysis), but partly by liquefaction and expectoration. Pneumonia may affect a lobe, or the whole of a lung, or it may attack both lungs. Double pneumonia occurs in about 10 per cent. of cases. Different parts of the same lung may at the same time show different stages. There is always some degree of pleural inflammation over the affected area. Modern enlargement of the spleen is very common."—(Wheeler and Jack's *Practice of Medicine.*)

ACUTE LOBULAR PNEUMONIA. "The disease affects both lungs, and begins in the terminal bronchioles, spreading thence to the infundibula and alveoli. The consolidated patches have therefore a lobular arrangement, but if many adjacent lobules are affected the consolidation may be almost lobar. The bronchioles are inflamed and frequently plugged with mucus, and their walls and the surrounding interstitial tissue are infiltrated with small cells. The walls of the air vesicles in the consolidated area are congested, their epithelium

is swollen, and their lumen is filled with proliferated epithelial cells, leucocytes, and a mucous or mucopurulent (not fibrinous) exudate. Many lobules are collapsed, but not inflamed, from plugging of the oronchioles. When cut into, the small consolidated areas are seen to be conical in shape, with their bases towards the pleura, reddish in color, with indefinite margins, and separated from each other by crepitant lung tissue. Adjacent lobules may be emphysematous (compensatory emphysema). The bluish-gray collapsed areas are most numerous in the lower lobes."—(Wheeler and Jack's *Handbook of Medicine.*)

4. ENDOCARDITIS.

Types: I. Acute { Simple / Malignant or Ulcerative { Septic / Typhoid / Cardiac

II. Chronic.

The difference between simple and malignant endocarditis is probably one of degree rather than of kind.

Etiology: Simple endocarditis is associated with rheumatism or scarlet fever. Malignant endocarditis is also associated with rheumatism, scarlet fever, and also with pneumonia or septic processes. Micrococci are often found. Chronic endocarditis may follow an acute endocarditis, or may be the result of syphilis, old age, high arterial tension, gout.

Morbid anatomy: In the simple form there will be found a cloudiness, followed by edematous thickening of the valvular endocardium; superficial erosions, and the formation of small granulations; deposits of layers of fibrin and corpuscles from the blood, the whole process resulting in the formation of small warty vegetations. These vegetations are most marked at a slight distance from the free borders of the valves—*i.e.* those parts which come into opposition during closure. In course of time they are transformed into fibrous tissue. According to Poynton and Paine the infective organisms are conveyed to the base of the valves by the capillaries, and thence pass to the subendothelial tissues by the minute nutrient channels in the valvular substance; others hold that the organisms are derived from the blood circulating over the surface of the valves. In the malignant form the initial changes are similar, but there are some important differences, inasmuch as ulcerations may completely replace the vegetations. The differences are: (1) The vegetations when present are larger and fungating. (2) The underlying tissues are necrotic and show loss of substance and round-celled infiltration. (3) They contain masses of micro-

cocci, while in simple endocarditis the organisms are scanty. The two forms cannot be distinguished by the organisms producing them; either simple or malignant endocarditis may arise from a pyogenic infection. (4) When the vegetations become detached they form *septic* emboli, giving rise to metastatic abscesses. (5) The ulcerative process causes great destruction of the valves, and may even lead to perforation of the curtains. (6) The subsequent or permanent changes in the valves, if the patient survive, are much more marked. (7) If the vegetation touches the mural endocardium as it flaps to and fro, the part touched becomes affected by contact.

As regards the side of the heart most affected—*Congenital* endocarditis attacks the right side of the heart (but note that many congenital cardiac lesions are due not to endocarditis, but to developmental faults); simple endocarditis attacks the left only; the *malignant* attacks *both sides*, though the *left* is much more implicated than the right side.

The vegetations are upon that side of the valve opposed to the blood-stream—viz., at the aortic valve the vegetations project into the ventricle, at the mitral valve into the auricle.

As in pericarditis, the myocardium almost always shares in the inflammatory affection.—(Wheeler and Jack's *Practice of Medicine.*)

5. The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 microns in length and from 0.2 to 1.0 micron in breadth, are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella, are non-motile, and aerobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue; they grow well on blood serum, slowly on gelatin, and with difficulty on potato.

6. *Carriers* are persons who, though apparently well, harbor within their bodies and distribute to their environment pathogenic bacteria. Diseases thus "carried" are: Typhoid, diphtheria, meningitis, tetanus, malignant edema, Asiatic cholera, dysentery, and perhaps poliomyelitis and other diseases.

HYGIENE AND PUBLIC HEALTH.

1. By *terminal* disinfection is meant the disinfection of a sick room and its contents at the termination of a disease. By *concurrent* disinfection is meant the dis-

infection of discharges, and all infective matter all through the course of a disease. Concurrent disinfection is by far the more important of the two, and the more thoroughly this method is carried out the less need there is for terminal disinfection. In diseases like typhoid, scarlet fever, and tuberculosis, concurrent disinfection should be insisted upon, and also a terminal disinfection. The latter may not always be necessary in a disease like measles. Both methods have reduced the spread of communicable diseases. Formaldehyde, in the presence of heat and moisture, is a good general terminal disinfectant. The *formalin-permanganate* method is in common use. 500 c.c. of formalin and 250 grams of potassium permanganate are required for each 1,000 cubic feet of air space. The permanganate is placed in a pail with a wide top, the formalin is poured on to the permanganate, and effervescence results with production of heat. The pail should be placed on a brick or other object to protect the floor from the heat evolved. In *concurrent disinfection*, different materials require different disinfectants; but in a general way chlorinated lime is a good disinfectant for stools; carbolic acid for sputum; superheated steam for linen.

2. *Insects* may carry disease by contact and by infecting food; typhoid and tuberculosis may thus be conveyed. Suctorial insects may also transfer infective material from the sick to the well; thus typhus fever may be spread by lice, and bubonic plague by fleas from the rat. Certain mosquitos may also act as intermediary hosts for pathogenic protozoa; malaria and yellow fever may be conveyed in this way.

To get rid of flies. Accumulations of dirt and filth must be removed or rendered distasteful to flies or larvæ by the use of lime, kerosene or cresol. Screens are used to keep flies out of houses; garbage must be disposed of in a proper manner; fly poisons such as arsenic or corrosive sublimate may be employed; fly traps are also useful; so, too, are fly papers.

To get rid of malarial mosquitos. All pools, stagnant water, or places where the anopheles may breed should be removed. Mosquitos and larvæ must be destroyed as far as possible. Fumigation by means of sulphur or pyrethrum will kill or stupefy the mosquitos, and in the latter case they can be swept up and burnt.

3. A *carrier* is a person who harbors a pathogenic microorganism but who shows no sign or symptom of the disease. The following diseases *may be spread by*

carriers: Diphtheria, infantile paralysis, malaria, meningitis, tetanus, typhoid, cholera, pneumonia, influenza, cholera.

The *control of carriers* is extremely difficult. Sanitary isolation may be enforced, and the carrier must be made to exercise scrupulous and intelligent cleanliness, and must not be allowed to handle food intended for others. A "carrier" may be safely employed as a carpenter, seamstress, or in some similar occupation without danger to his fellows. In certain diseases, where it is possible, autogenous vaccines may be of service. In cases where treatment is unsuccessful or impossible the carriers should be under the supervision of the health authorities.

4. "Domestic water supply may be purified by sedimentation, boiling, distillation, chemicals, or by filtration. By *sedimentation* it is possible to free the water from its mechanical impurities, sand, dirt, etc., without, however, much affecting matters held in solution. By *boiling*, all organic matter and germs are destroyed; the taste of the water is, however, changed, owing to expulsion of gases. By *distillation*, a chemically pure water is gained, which may be made palatable by the addition of carbonic acid. By the *addition of chemicals* to suspicious water—small doses of borax, boracic acid, potassium permanganate, copper sulphate, etc.—the organic matter may be rendered harmless; but as those chemicals are not a desirable addition to water, this method of purification is objectionable. In ordinary households the boiling of waters is a good precaution whenever the water supply is suspicious. Distillation, provided the proper apparatus is at hand, is the ideal method. Water may be purified of all, or nearly all, of its impurities by filtration, the value of the process depending upon the medium of filtering, the efficiency of the filter, and the thoroughness of the process. The materials used for filters are wool, asbestos, sand, stone, porcelain, infusorial earth, carbide of iron, charcoal, etc. Infusorial earth pressed in the form of hollow tubes is used in the Berkefeld filters, which are efficient, although needing frequent cleansing."—(Price's *Epitome of Hygiene.*)

5. *Whooping cough* is caused by the bacillus of Bordet and Gengou. It is transmitted by the secretions of the nose and mouth, droplet infection, by the use of handkerchiefs, cups, toys, etc., also by domestic animals. Prevention is effected by fourteen days isolation of those who have been exposed to infection; the patient must avoid contact with others; isolation and

avoidance of infection are necessary. Vaccines have been used.

Diphtheria is caused by the *Bacillus diphtheriæ*. It enters the body by the mouth or nose (occasionally elsewhere), and is conveyed by contact, coughing, speaking, fingers, toys, food, droplet infection, and by carriers. It may be prevented by isolation of cases and carriers, by the injection of diphtheria antitoxin, disinfection of mouth and nose discharges and of toys, cups, spoons, etc., used by the patient.

Typhoid is caused by the *Bacillus typhosus*. It enters the body by the mouth, and is conveyed by food, fingers, flies, carriers, and fomites. It may be prevented by inoculations; early diagnosis and isolation, with proper disinfection of secretions are necessary; proper water supply, and suppression of flies are important factors in the prevention of this disease.

Typhus is caused by an anerobic bacillus, described by Plotz. It is transmitted by the body louse. It may be prevented by cleanliness of person and clothing, destruction of lice and nits; the patient's hair must be clipped, and his clothing baked or steamed.

Tetanus is caused by the tetanus bacillus. It is spread by soil, dust, flies, and is a wound complication. Prevention consists of cleanliness, avoidance of wounds, free opening of punctured and lacerated wounds with removal of foreign matter. Excision of the wound may be advisable; tetanus antitoxin is a specific.

Acute anterior poliomyelitis is caused by a filterable, "ultramicroscopic" virus. It is transmitted by contact, the virus leaving by the discharges of the nose and mouth of one person and entering by the same route in another; insects are also believed to transmit the disease. Prevention is uncertain; isolation, cleanliness, and destruction of insects may all be tried.

Ophthalmia neonatorum. It is caused by the gonococcus or some other pyogenic microorganism; the secretions of the mother contain the infecting agent, and transmission may occur directly during parturition, or indirectly by the fingers of physician or nurse, cloths, instruments, etc. Prevention: Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth.

Smallpox. The cause is unknown; so, too, is the mode of transmission. Prevention consists in vaccination, and prompt isolation of patient.

6. *Cold may produce the following ill effects*: Sense of chilliness, paleness of the skin, shivering, numbness, livid spots on skin, syncope, lassitude, languor, confusion of senses, dulness of mind, slow or interrupted respiration, small pulse, feeble and quick or irregular heart-beat, coma, and death. Tissue metamorphosis is rapid; more food (especially carbonaceous food) is required; oxygenation of blood and elimination of carbon dioxide are increased; skin functions are reduced to a minimum, and excretion of urine is increased.

Heat may produce the following ill effects: Respirations are lessened, elimination of water and CO_2 is diminished, the heart's action is slowed, the appetite and digestion are impaired, the nervous system is depressed, the action of the kidneys is increased and that of the lungs is diminished, less food is required, metabolism is decreased, less urea is eliminated. *Preventive measures* include the avoidance of too sudden change from heat to cold, the protection of the body from cold and draughts, the wearing of proper clothing, and the protection of the extremities from cold. Attention must be paid to the skin and the urine, a proper amount of water must be drunk, alcohol should be avoided, and food must be suitable in quality and quantity.

Probable effects of dampness: "Damp houses are cold houses, damp walls are cold walls, because damp walls and moist air are good conductors of heat. Individuals lose more body heat in damp houses; more fuel is needed to warm such houses. Damp houses favor chilling of the body surfaces, have a depressing effect on the human organism, and decrease its resisting powers. Damp houses favor development of moulds, fungi, dry rot in wood, efflorescence and saltpetering in masonry, and also favor insects and germ life within the house. Damp houses cause the mildewing of clothes, injure furniture, produce spots on walls, make house cleaning difficult, heating expensive, interfere with ventilation, and decrease the suitability of the house as to comfort and shelter. Damp houses may safely be regarded as predisposing causes of tuberculosis, bronchitis, pneumonia, nephritis, rheumatism, and other diseases."—(Price's *Epitome of Hygiene.*)

To prevent dampness: "Perfect dryness of foundation, walls, and roof, and exclusion of ground air, are necessary conditions of house construction. The subsoil around the site, and, if there is much damp, also below it, should be drained, and, except where there is a rock foundation, the walls should be embedded in concrete, and under the whole house should be a layer of concrete

6 inches thick, having on the top a layer 1 inch thick of some impervious material, such as asphalt or cement. In order to prevent damp rising from the ground a *damp-proof course* should be inserted in the wall just above the ground level. Perforated slabs of glazed stoneware may be made to serve not only as a damp-proof course, but to ventilate the space under the floor. It is advisable to have a damp-proof course also where the rain-gutter joins the parapet, and in chimney-stacks just above the roof. Basement walls are liable to become wet when in contact with a damp soil even when there are drains and damp-proof courses. In this case 'a dry area' must be formed by digging out or by building a second thin wall outside and a few inches away from the main wall, or by inserting slabs in a slanting position between the soil and the house wall, or the walls may be built hollow (with two damp courses) and joined together with iron ties or bonding bricks, or the hollow may be filled with asphalt. Walls exposed to driving rain or sea spray may be coated with slates, vitrified slabs, alkaline silicates, or cement; but such coating should continue down to the 'footings,' and should not be applied while the bricks are wet. The walls of a newly built house are damp from the water used in mixing the mortar, and also that absorbed by the bricks. If salt water, sea sand, or refuse lime from soap works, containing glycerin, has been used in the mortar, it will never dry. Mortar should be composed of good lime combined with clean sharp sand, free from earthy matter (road scrapings or mold have sometimes been used by unscrupulous builders), or with crushed stone, slag, or well-burnt clay. Walls are sometimes built of concrete made with cement. For internal walls, where space is limited, coke-breeze with cement has been used. The settling of the walls sometimes breaks the drain passing underneath, if not properly protected by concrete or by the formation of an arched opening in the wall. It is usual to defer putting in drains until after the building has been carried up, with the view of allowing it to settle upon its foundations. If there be no cellars the flooring ought to be raised two feet above the ground, which should be covered with cement and the space ventilated to prevent growth of the fungus of 'dry rot.' Walls and ceilings are usually covered with plaster, which should be of good materials ('jerry' builders have been known to use a mixture of lime and sifted mold or street refuse for this purpose). It should be finished with a smooth, non-porous surface. If a room is not to be papered the

walls should be coated with some form of cement or distemper, which sets hard and prevents percolation. In cheaply built modern houses the inner walls are often not carried up in brick beyond the first floor, and above this height are continued by a frame of wood filled in with lath and plaster."—(*Aids to Sanitary Science.*)

OBSTETRICS AND GYNECOLOGY.

1. In *threatened abortion* there are slight pains or hemorrhage which indicate that the uterus may empty itself, but there is a fair prospect that this may be prevented.

An abortion is *inevitable* when the signs and symptoms indicate that there is no method of preventing the uterus from emptying itself.

A *complete abortion* is one in which both the ovum and its membranes are cast off intact.

An *incomplete abortion* is one in which part of the ovum or membranes is retained in the uterus.

In *threatened abortion* the woman should be put to bed and her rectum should be emptied by an enema, a suppository containing morphine may be administered; if the hemorrhage is more than moderate in amount a vaginal tampon of sterile or iodoform gauze may be indicated.

Inevitable abortion demands rest in bed, and tamponade of the cervix and vagina; after the cervix is dilated the ovum must be removed and the uterus thoroughly cleaned out. Aseptic technique is necessary, and trauma and lacerations must be avoided.

In *incomplete abortion* the cervix must be dilated (if necessary), the uterus thoroughly cleaned out, and an intrauterine douche of sterile water given, a light tampon of iodoform gauze is placed in the vagina; a strip of gauze may be placed in the uterus in case of sharp retroflexion to secure free drainage, and sometimes an intrauterine tampon will be necessary when the hemorrhage persists or the uterus refuses to contract.

2. ECTOPIC GESTATION. *Diagnosis:* "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility; nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy; pains are often very severe, with marked tenderness

within the pelvis; such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating; this tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The os uteri is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*"—(*American Text Book of Obstetrics.*)

3. *Forceps in occipito-posterior positions:* "The blades are put in exactly as for cases where the occiput has rotated anteriorly. But since the occiput is now toward the sacrum, the *extension will, of course, be downward and backward over the perineum,* instead of upward toward the pubes; hence the handles of the instrument, at first lifted somewhat upward toward the pubes to draw the occiput up to the edge of the perineum, must, when the head emerges, be directed *downward and backward,* instead of toward the *mons veneris.* A moment's reflection will show that the short *straight* forceps (without any sacral curve) should be used in these cases; for the said curve is only adapted to follow the axis of the pelvic canal, but during *backward* extension of the occiput over the perineum the head departs from the axial line and goes in an almost opposite direction. If the *curved* forceps were used, the ends of the blades would impinge against the pubic arch while the handles were being depressed in following the movement of backward extension. Again, owing to the depth of the posterior pelvic wall being three times as great as that of the anterior one, there is so much the more difficulty in getting the occipital end of the occipitomental diameter to escape over the edge of the perineum, hence greater danger of laceration, and necessity for extra care that the occipital pole *really* shall have cleared the perineum before extension is attempted."—(King's *Obstetrics.*)

4. Conditions that justify the induction of premature labor: (1) Certain pelvic deformities; (2) placenta prævia; (3) pernicious anemia; (4) toxemia of pregnancy; (5) habitual death of a fetus toward the end of pregnancy; (6) hydatidiform mole; (7) habitually

large fetal head. The methods that may be employed are: Partial dilatation of the cervix and the introduction within the cervix (and vagina) of a tamponade of sterile gauze; (2) dilatation of the cervix; (3) puncturing the membranes; (4) introduction of a soft rubber bougie into the uterus; (5) intrauterine injection of glycerin, water, or some other fluid.

5. *Fibroids are classified* as: (1) *Interstitial* or *intramural*, when they are entirely in the muscular wall of the uterus; (2) *Subperitoneal* or *subserous*, when they bulge ontward beneath the peritoneum; (3) *Submucous*, when they bulge into the uterine cavity.

The *symptoms* are: (1) *Hemorrhage*, the degree of which depends upon the nearness of the tumor to the endometrium or to the peritoneum; the nearer to the uterine mucosa, the greater the hemorrhage, and the nearer the tumor is to the peritoneum, the less the hemorrhage. There is no relation between the degree of hemorrhage and the size of the tumor. (2) *Pressure* and *traction* may cause disturbances of rectum, bladder, ureters, urethra, and uterus; hence there may be tenesmus, diarrhea, frequency of urination, dysuria, retention of urine, uterine displacements, hydronephrosis, and cystitis. Other symptoms are pain, leucorrhea, anemia, and generally impaired health.

6. *Causes of dysmenorrhea:* Pelvic congestion, pelvic inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis or obstruction of the cervix, prolapse or displacement of the uterus.

Treatment should first of all be directed toward discovering the cause and (if possible) removing it. General methods of treatment and hygiene are indicated; advice should be given on such matters as rest, exercise, proper diet, care of bowels and bladder, bathing, clothing, change of residence; massage, douches, tampons, and electricity may prove of service. Innumerable drugs have been recommended, such as apiol, bromides, phenacetin, antipyrin, cannabis indica, viburnum prunifolium, amyl nitrite, and salicylates. Alcohol should be avoided, if possible; so, too, should unnecessary local examinations and applications.

SURGERY.

1. FRACTURE OF THE PATELLA is *caused* by muscular violence and by direct violence. "*Fracture by direct violence* is often star-shaped, and the aponeurosis is not torn, so that the fragments are not separated. Signs of local injury, pain, and bruising are apparent. *Treatment consists* in keeping the limb at rest on a

back-splint and applying an ice-bag. Early passive movement and massage are advisable.

"*Fractures due to muscular violence* are more common. They are always transverse; the aponeurosis and capsule on either side of the patella are torn, and the fragments are separated. The patella is broken when poised on the condyles in the semiflexed position. It is then held down by the ligamentum patellæ, and when the quadriceps is suddenly contracted, as in a person trying to regain the upright position, the patella snaps. *Signs:* There is loss of the power of extension, separation of the fragments, and pain, followed by distension of the joint with blood, and synovitis. The aponeurosis is torn at a different level to the fracture, and hangs over between the fragments. The lower fragment is tilted forwards. *Treatment:* The best method is open operation, and wiring four or five days after the accident; for only by this means can bony union be obtained. The obstacles to bony union, without open operation, are that the tilting of the lower fragment cannot be overcome in any other way; the aponeurosis cannot be removed from between the fragments, nor the blood-clot from the joint, except by slow absorption. If no operation is done the union is fibrous, and the fibrous bond will stretch unless the patient be condemned to a stiff knee for six to twelve months. A working man is badly off with either a stiff knee for that time or a stretched bond forever. The *open operation* must necessarily be aseptic. The knee may be washed out with 1 in 40 carbolic or 1 in 2,000 bichloride without injury, or sterilized saline solution may be used. The joint is opened by a horseshoe incision, the blood-clot is removed, the aponeurosis clipped away, the bones drilled and fixed in accurate apposition with silver wire, and the wound is closed without drainage. As atrophy of the quadriceps occurs early, massage and passive movements must be begun in ten days. The patient may go about on crutches in three weeks. Bony union is firm in six weeks. *Retentive apparatus* is used where operation is inadvisable or refused. This may be plaster of Paris, but does not admit of massage. Another plan is to use mole-skin plaster covering the thigh, and kept fastened to the lower part of a back-splint by elastic extension. Or poroplastic may be moulded, one piece over the thigh, the other over the leg, the upper piece being cut out to fit around the upper part of the patella, and the lower to fit around the lower part. These are bandaged firmly to the limb, and fastened together on either side of the patella by

Malgaigne's hooks, which are screwed up daily as they become loose. At the end of six weeks the patient is allowed up, but must wear a knee-splint to keep the joint stiff for six to twelve months."—(*Aids to Surgery.*)

2. HIP JOINT DISLOCATIONS.—*Varieties—Backward:* (1) On to the dorsum ilii; (2) on to the sciatic notch. *Forward:* (3) On to the obturator foramen; (4) On to the pubis.

Dorsal dislocation: Head of femur lies on the dorsum ilii, and can be felt in the buttock. The obturator internus is ruptured in most cases. The short rotator muscles are lacerated. The trochanter lies well above Nelaton's line and approximated to the anterior superior iliac spine. The leg is shortened two to three inches. The iliotibial band is relaxed. The leg is flexed, adducted, and inverted. The femur crosses the lower third of the opposite thigh. The toe rests on the opposite instep. A hollow exists in Scarpa's triangle.

Sciatic dislocation: Similar to the above, except in the following:—The obturator internus tendon is intact and lies over the neck of the femur, holding it down in the sciatic notch. Shortening amounts only to one inch or less. The axis of the femur crosses the opposite knee. The great toe rests on the dorsum of the opposite great toe.

Treatment of the backward dislocations: Flex the knee and thigh in position of adduction. Abduct the thigh and evert simultaneously. Bring the leg down straight. "Lift up, bend out, roll out."

Obturator dislocation: The head of the bone lies on the obturator externus in the obturator foramen. The abductor muscles are lacerated. The trochanter is obscured, the iliotibial band is tense. The leg is lengthened, the toes point forward and outward. Flexion, abduction, and rotation outward are well marked. The head of the femur is felt in the perineum. The capsule is torn in its lower part. Pain referred to the distribution of the obturator nerve.

Public dislocation: Similar to the above except: The femoral head is felt under Poupart's ligament. The leg is shortened about one inch. Abduction and eversion are more marked, the toes pointing outward.

Treatment of forward dislocations: Thigh is flexed in a position of abduction. Adduct the thigh and then invert it. Bring the thigh down straight. "Lift up, bend in, roll in."—(From Groves' *Synopsis of Surgery.*)

3. *Carbuncle* is a localized inflammation of the subcutaneous tissue, which has gone on to sloughing.

Staphylococci are the exciting cause; diabetes, albuminuria, infective fevers, and lowered vitality are the predisposing causes.

The disease begins as an infiltration of a patch of subcutaneous tissue, which is hard, painful and tender, and the skin over it red and hot. The infiltration may extend till it is the size of a dinner-plate, and the inflammation ends in sloughing and suppuration, not only of the subcutaneous tissues, but of small areas of the skin over it, so that openings develop in the skin, and allow of the exit of pus and sloughs. The openings extend, the sloughs separate, and the wound heals by granulation. The back is a common situation. Sometimes the face is affected, and there is then a danger of thrombosis extending to the cavernous sinus and producing pyemia.

Treatment: Anesthetize, scrape away the slough, treat the surface with pure phenol, dress with antiseptic gauze, and give the patient good food and tonics.

4. "*Tuberculous disease of the kidney* occurs in three forms: 1. As part of general tuberculosis, and giving rise to no special symptoms. 2. It may extend upwards from tuberculous disease of the bladder and affect both kidneys. The mucous membrane of the ureters, pelvis, and calyces, and finally the kidney itself, become converted into tuberculous granulation tissue. The kidneys become enlarged owing to hydronephrosis or pyonephrosis, and a perinephric abscess may follow. Death occurs from chronic toxemia or uremia. Treatment is of little use. 3. Primary tuberculosis of the kidney is unilateral. A focus of tubercle begins in the cortex, caseates, and spreads to the pelvis, infecting it. Pyonephrosis follows, and infection of the bladder may succeed it. Perinephric suppuration may also occur. The *symptoms* at first consist of aching pain in the loin and frequent micturition, not improved by rest. Hematuria comes on early and without apparent cause, is not increased by movement or improved by rest. Pus is usually present in acid urine, and the *Bacillus tuberculosis* may in some cases be detected. In the late stages the kidneys may be felt much enlarged. The *diagnosis* is doubtful in the early stages, unless bacilli can be demonstrated by the microscope or inoculation of a guinea-pig. The hematuria is much slighter than in cases of renal calculus, and is not influenced by rest. The hemorrhage is not so profuse as in cases of new growth. Slight attacks of renal colic may occur from the passage of caseous matter, but not severe attacks like those due to calculus. An exploratory incision

settles the diagnosis in doubtful cases."—(*Aids to Surgery.*)

5. *Gallstones.* "While the calculus remains free in the gall-bladder, usually there are no symptoms. Impaction of the stone in the common duct gives rise to intermittent jaundice, following sharp pain in the right hypochondriac or epigastric region, frequently radiating toward the right scapula, nausea, vomiting, sweating, depression, and often intermittent fever (Charcot's intermittent fever). When the stone is impacted in the cystic duct, jaundice is less common, but the hepatic colic is severe, and dropsy of the gall-bladder may occur. The diagnostic points are the age, sex, history of previous attack, with jaundice and intermittent fever, location of the pain, dark, amber-colored urine, containing bile, and sometimes the finding of the stone in the feces.

Complications and sequels. (1) Suppurative cholecystitis (empyema of the gall-bladder); (2) secondary abscesses; (3) permanent jaundice, with production of Charcot's intermittent fever; (4) ulceration and passage of stone into the intestine; (5) obstruction of the bowels from gallstone; (6) stricture of the ducts and atrophy of the gall-bladder."—(*Pocket Cyclopedia.*)

Surgical treatment. Cholecystotomy is done through an incision parallel to and 1½ inches below the costal margin over the gall-bladder. The liver is drawn up and the intestines packed away with gauze. If the gall-bladder is distended the fluid is removed by tapping it with a trocar and cannula. The opening is then enlarged, and the stones are removed with a scoop. The bile-ducts are examined along their whole course by a finger externally, and by a long probe internally. If the interior is fairly healthy, the opening is sutured with two layers of continuous sutures and the abdomen is closed. Usually it is necessary to drain the gall-bladder for a time, in which case the margins of the opening are stitched to the peritoneum and transversalis fascia of the abdominal wound. The fistula thus established soon closes if there is no obstruction to the passage of the bile into the intestine. If not, it must be closed by a plastic operation or cholecystenterostomy."—(*Aids to Surgery.*)

6. MIDDLE MENINGEAL HEMORRHAGE. "*Symptoms:* When not obscured by some other cerebral lesion, the typical symptoms are—(1) temporary concussion; (2) a lucid interval of a few minutes to a few hours; (3) gradually increasing drowsiness ending in coma. If the hemorrhage is rapid or there is cerebral laceration as well, there may be no interval of con-

sciousness. In addition there may be, from pressure on the motor area, twitching of the corresponding parts followed by paralysis. The pupil on the injured side becomes first fixed and dilated, the other following. When the coma is well marked the pulse is slow and full, and the breathing is stertorous. When the brain is lacerated there are alternating tonic contraction and relaxation of the muscles supplied from the injured area. The *Prognosis* is very grave. The *Diagnosis* is difficult, unless the symptoms are typical, and they seldom are. *Treatment* consists in trephining, removing the blood-clot, and stopping the bleeding. A flap is turned down, and a trephine hole made over a spot 1½ inches above and behind the external angular process exposes the anterior branch. After the blood-clot is removed the bleeding-point is searched for and tied; if it is not seen, more bone must be clipped away. If the bleeding comes from a canal in the bone, it may be stopped with gauze, sponge, or aseptic wax. If the brain then expands, the bone may be replaced and the wound stitched up without drainage; if not, the bone must not be replaced, and the wound should be drained for twenty-four hours. The posterior branch can be reached by a hole made just below the parietal eminence."—(*Aids to Surgery.*)

1. MEDICINE.

PERICARDITIS WITH EFFUSION	CARDIAC DILATATION
Recent history of gout, acute rheumatism, acute infectious or septic disease, scurvy, nephritis, or tuberculosis, chronic gonorrhea.	Usual history of chronic valvular disease of the heart.
Fever and slight pain often associated.	No fever or pain, as a rule.
Nervous symptoms are often present.	Absent or but slight.
Inspection often reveals bulging. Apex-beat is elevated, feeble, and later absent.	Apex-beat usually visible, wavy, and diffuse.
Heart's impulse usually absent, or occupies center or upper border of dull area. Friction fremitus may be present.	Though feeble, the impulse is palpable.

Pericarditis with Effusion	Cardiac Dilatation
Percussion shows a triangular flat area, and the boundary line alone changes on altering the position of the patient. There is dull tympany in the axillary region. Dullness over left lung below angle of scapula common.	Dull area varies with the chambers dilated; it is co-existent with a wavy impulse, does not extend so high (except in mitral stenosis), and does not vary with change of position. There is no dull tympany.
Auscultation shows the first sound distant and muffled; a friction rub is often present.	First sound clear, short, and sharp resembling the second sound. Friction murmur rare, but an endocardial murmur may appear later.

—(From Anders and Boston's *Diagnosis.*)

2. Lobar Pneumonia. *Diagnosis:* (1) From *acute phthisis:* The symptoms and physical signs of *lobar pneumonia* and *acute pneumonic phthisis* may be the same for the first eight or ten days; at this period the fever in *pneumonia* drops by crisis; whereas in *phthisis* the fever continues for some time longer and the patient gets worse; the sputum contains tubercle bacilli and elastic fibers, and instead of retaining the rusty color it becomes purulent and greenish.

In *pneumonia*, the breathing is very rapid, the pulse-respiration rate is disturbed, the fever is usually high, and runs a regular course, crepitant râles are heard at first, then signs of consolidation follow, and crepitant râles again succeed.

In *phthisis*, the breathing is hurried and there is dyspnea; the fever is often high, but does not run a regular course. At first the signs are those of bronchitis, followed by consolidation, a softening, or excavation in different parts of the lungs; sometimes there is nothing to be heard but scattered râles.

Acute pulmonary congestion is "undistinguishable from the first stage of pneumonia."—(Butler.)

3. Epidemic cerebrospinal meningitis. *Etiology:* The *Diplococcus intracellularis meningitis.* Sporadic cases may be due to the pneumococcus, streptococcus, colon bacillus, typhoid bacillus, bacillus of influenza, or gonococcus; but the epidemic form is always caused by the *Diplococcus intracellularis.* It enters the system *through the mucous* membrane of nose, mouth, or

pharynx, and reaches the meninges by way of the lymphatics or the circulation. The disease may be conveyed by "carriers." *Diagnosis* is made from (1) the symptoms, (2) Kernig's sign, and (3) lumbar puncture. *Symptoms:* The onset is generally sudden, with headache, rigors, stiff neck, opisthotonos, vomiting, moderately high (102° F.) and irregular fever, full and rapid pulse, herpes, photophobia; convulsions, delirium, monoplegia or hemiplegia, enlarged spleen, retracted abdomen, and disturbed reflexes may be present *Kernig's sign* is obtained (if the thigh is flexed at right angles to the abdomen, the leg cannot be fully extended on the thigh, as it can in health, owing to the contraction of the flexor muscles). By *lumbar puncture*, some of the cerebrospinal fluid may be withdrawn and examined for the presence of the diplococcus.

4. *General treatment of typhoid fever.* "As soon as the nature of the disease is recognized the patient should be confined to bed. The room should be large and airy, and provided with efficient means of securing thorough ventilation. The temperature of the room should be maintained between 65° and 70° F. The bedpan must be used from the beginning until convalescence is well advanced. The stools and urine should be rendered innocuous before being thrown out. This may be done by treating the evacuation with twice its volume of a 1 per cent. solution of chlorinated lime or a 5 per cent. solution of carbolic acid, and allowing it to stand in a covered vessel for two hours before emptying it into the closet. Soiled clothing should be thoroughly boiled. The *diet* should be liquid or semisolid, unirritating, and easily digestible. Milk alone (6 ounces every four hours) does not supply the required number of calories (2,500-3,000), but, as a rule, it should form a large part of the diet. It may be given diluted with lime water, or as buttermilk, malted milk, koumiss, junket, or ice cream. Among other suitable foods may be mentioned raw or soft boiled eggs, chicken jelly, milk toast, strained oatmeal gruel, potato puree, tea, coffee, cocoa, fruit juices, wine jelly, and custard. Beef tea and broths may be harmful. In the event of digestive disturbances the diet should be restricted for a time to whey or albumin water. Water, plain or flavored (lemonade, soda water, etc.), should be given in large amounts between the feedings. When the first sound of the heart becomes weak and the pulse dicrotic, alcohol is usually indicated. From 4 to 8 ounces of whisky or brandy may be given in the twenty-four hours, the amount being determined by the general

effect. The *cold bath* or the *cold pack* affords the best means of controlling fever and preventing the development of severe nervous symptoms. It may be employed every three or four hours when the temperature is 102.5° F. or over. Hemorrhage, signs of perforation, menstruation, and great prostration are contraindications.

"*For the hemorrhage:* Absolute rest is imperative. Cold bathing should be suspended. It is advisable to elevate the foot of the bed. An ice-bag may be applied with advantage to the right iliac region, and ice may be given to suck. The best drug is morphine (⅙ to ¼ grain) hypodermically. Ergot is useless. In cases of recurrent hemorrhage calcium lactate (10 grains thrice daily) and gelatin may be given by the mouth."—(Stevens' *Manual of Practice.*)

5. *Salvarsan is indicated* in: "(*a*) Early cases of syphilis in which contagious manifestations are appearing in rapid succession, in spite of efficient mercurial medication. (*b*) Cases in which, for family or social reasons, it is of special importance to limit the production of infective material or cause the disappearance of symptoms in the shortest possible time. (*c*) Cases in which the symptoms are recalcitrant to the action of mercury, or in which, from idiosyncrasy, that drug cannot be exhibited in sufficient dose. (*d*) Cases of syphilophobia and syphilomania, whether showing symptoms or not; its psychic action in these instances being of greater importance than its therapeutic effect. (*e*) Very early cases of the sequelæ of the luetic infection, before organic changes have occurred."

Salvarsan is contraindicated in: "(a) Cases that are doing well, *i.e.* in which the disease is pursuing its normal mild course under ordinary medication. (*b*) Cases with serious organic lesions of the eyes, kidneys, heart, or other internal organs. (*c*) Cases with post-syphilitic or parasyphilitic disease of the internal organs, more especially of the nervous system."—(*Progressive Medicine.*)

It may be administered intramuscularly or intravenously. The intravenous injection is described by Hirsch as follows: Two graduated glass containers of 250 c.c. capacity are used. Into one is poured 150 to 200 c.c. of sterile salvarsan solution. The other is filled with a like volume of sterile saline solution (made with sterile distilled water and chemically pure sodium chloride). The saline solution is allowed to flow out of the needle so as to expel all air from the tube. The stopcock is now reversed, allowing the salvarsan solu-

tion to flow out of the needle, thereby expelling all air from its tubing. The stopcock is now reversed to its former position, until the saline solution is running in a slow, even stream from the needle. The desired site of puncture is selected on the arm or at the elbow, and the needle is gently pushed or thrust through the skin into the vein. Meanwhile the saline solution is continuously running from it. The needle is held at about an angle of 10 to 15 degrees to the skin surface, depending on the prominence and caliber of the vein. Care must be exercised not to push the needle through both walls of the vein. This accident can best be avoided by not introducing too long a surface of the needle into the tissues.

Dosage depends on the type and stage of the disease. Generally from 0.1 to 0.6 gm. is used at intervals of from 5 to 10 days.

6. The diagnostic possibilities are: Uremia, with impending convulsions and coma, with chronic nephritis; cerebral thrombosis (in spite of the high blood pressure); small hemorrhage or tumor in the neighborhood of the island of Reil; arteriosclerosis, with vascular spasm; diabetes. Further clinical methods would include examination of the fundus oculi; complete examination of urine, including a measure of the total quantity passed by day and by night separately, an estimation of the total urea eliminated, the phenolsulphonephthalein test, and tests for sugar.

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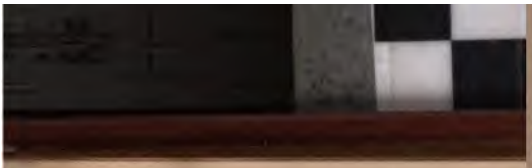

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